JOURNAL

of the

INDIAN MEDICAL ASSOCIATION

VOLUME 35 NUMBER 3 CALCUTTA AUGUST 1, 1960

Published twice a month. Annual Subscription : Inland Rs. 24/- ; Foreign Rs. 30/- ; Single copy : Inland Re. 1/- ; Foreign Rs. 1.25

If YOUR PATIENT IS IN NEED OF
Vitamin B-Complex in a practical form
PRESCRIBE

VIBITON

B. C. P. W. BRAND

POTENT AND PALATABLE

VITAMIN B-COMPLEX

useful in

Vitamin deficiency resulting in symptoms of fatigue, anorexia and loss of weight, etc.

Vibiton Contains per Fluid Ounce :

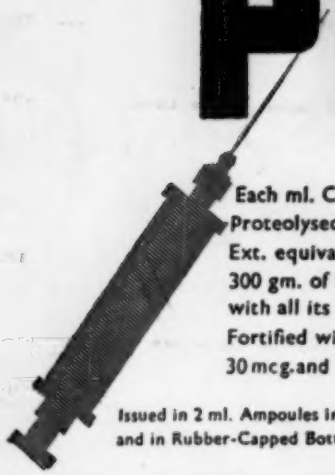
Vitamin B_1 (Thiamine Hydrochloride) 16.0 mg., Vitamin B_2 (Riboflavin) 4.0 mg., Vitamin B_6 (Pyridoxine) 2.0 mg., Vitamin B_{12} 10.0 mcg., Cal. Pantothenate 12.0 mg., Choline Chloride 60.0 mg., Methionine 250.0 mg., Nicotinamide 50.0 mg., Sodi Glycerophos. 400.0 mg., Liver Extract (in terms of fresh liver) 80.0 gm. Malt Extract qs. Absolute Alcohol 15% v/v. Extra quantities of Vitamin B_1, B_2, B_6 Nicotinamide and Cal. Pantothenate are added to compensate loss due to storage.

Available in 4 oz. phial and 1 lb. bottle

BENGAL CHEMICAL • CALCUTTA • BOMBAY • KANPUR

For Intensive Treatment Of Anaemia

PROLEX *forte*



Each ml. Contains :
Proteolysed Whole Liver Ext. equivalent orally to 300 gm. of Fresh Liver with all its Factors Fortified with Vit. B_{12} 30 mcg. and Folic Acid 7·5 mg.

Issued in 2 ml. Ampoules in Boxes of 6, 12 & 50 and in Rubber-Capped Bottles of 5 ml. & 10 ml.,

PROTEOLYSED WHOLE LIVER EXTRACT FORTIFIED WITH VITAMIN B_{12} AND FOLIC ACID.

BENGAL IMMUNITY CO., LTD.

B.I. B-COMPLEX

each cc. contains:

Vitamin B_1 (Thiamine Hydrochloride)	25 mg.
Vitamin B_2 (Riboflavin)	1 mg.
Vitamin B_6 (Pyridoxin Hydrochloride)	3 mg.
Nicotinamide	50 mg.
Panthenol (d-pantothenyl alcohol)	4 mg.
Choline Dihydrogen Citrate	25 mg.
Benzyl alcohol as preservative	1·5%

1 C.C. AMPOULES
BOXES OF 6, 12 & 50.
10 C.C. RUBBER CAPPED BOTTLES.

B.I. ELIXIR B-COMPLEX

4 OZ., 6 OZ. & 16 OZ. BOTTLES

each fluid ounce contains:

Vitamin B_1 (Thiamine mononitrate)	25 mg.
Vitamin B_2 (Riboflavin)	6 mg.
Vitamin B_6 (Pyridoxin Hydrochloride)	8 mg.
Nicotinamide	80 mg.
Panthenol (d-pantothenyl alcohol)	20 mg.
Choline Dihydrogen Citrate	500 mg.
Vitamin B_{12} (cyanocobalamin)	12 mcg.
Alcohol by volume in a syrup base	8%

BENGAL IMMUNITY CO., LTD.
153, Dharamtalla Street, Calcutta-13

TABLE OF CONTENTS

ORIGINAL ARTICLES: Page

1. Anaemia in Industrial Workers of Kanpur —R. K. Thapar 97
2. Antistreptolysin 'O' Level in Indians —L. K. Ganguli, A. Sengupta, (Miss) M. Chandra and K. C. Basu Mallick ... 110
3. Abnormal Fissures and Lobes of the Lungs: Preliminary Observations on Some Cases —J. S. Makhani and G. A. Kher 112

PRACTITIONERS' SERIES:

Anaemias: Their Management—J. B. Chatterjea ... 116

CASE NOTES:

1. Milkman's Syndrome—R. B. Bhagwat ... 123
2. Takayashu's Syndrome—S. J. Damany and R. M. Shah 124
3. Hypertension Associated with Stenosis of the Renal Artery—V. C. Vasantha, V. Kameswara Rao and D. J. Reddy 128

EDITORIAL: Page

Occupational Health 130

GENERAL PRACTICE DIGEST 131

CURRENT MEDICAL LITERATURE 132

CURRENT TOPIC:

The Epidemiology of Cancer of the Lung ... 134

NOTES AND NEWS 138

REVIEWS 138

OBITUARIES 139

SUPPLEMENT:

1. XII Orissa State Medical Conference, Bhubaneswar, 1960 141
2. Branch Notes 143

new...

A MASTERPIECE OF ANTIBIOTIC DESIGN

far greater antibiotic activity

Milligram for Milligram, LEDERMYCIN exhibits 2 to 4 times the activity of tetracycline against susceptible organisms. Provides significantly higher serum activity level...

with far less antibiotic intake

Demonstrates the highest ratio of prolonged activity level to daily milligram intake. Reduces likelihood of adverse effect on intestinal mucosa or interaction with contents.

unrelenting peak antimicrobial attack

High activity level is uniquely constant. Eliminates peak-and-valley fluctuation, favoring continuous suppression. Achieved through remarkable stability, resistance to degradation and slow excretion.

plus "extra day"

activity for protection against relapse

Maintains activity for one to two days after discontinuance. Ensures unusual security against resurgence of primary infection or secondary bacterial invasion—two factors often resembling a "resistance problem."

ENHANCING THE TRADITIONAL ADVANTAGES OF TETRACYCLINE

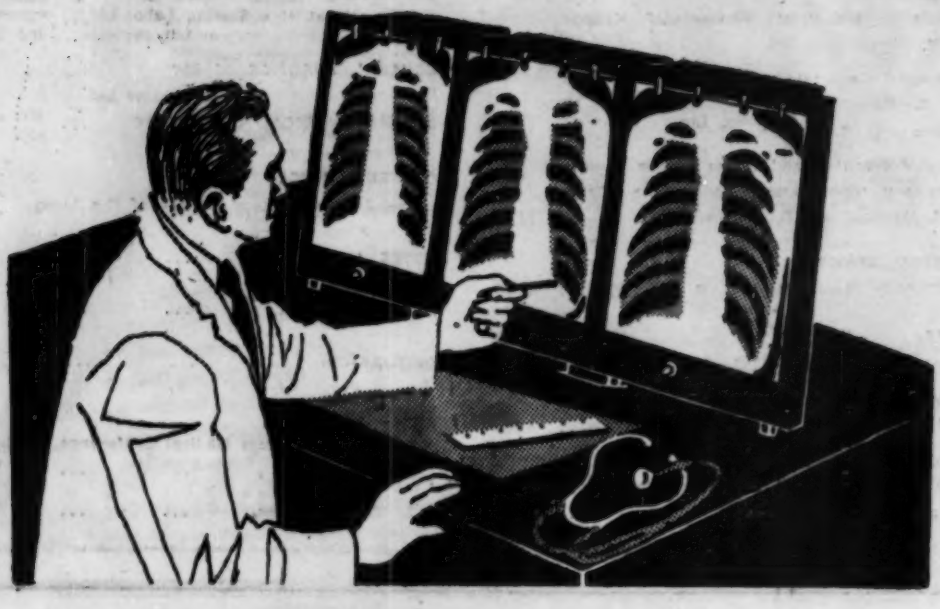
Supplied: 150 mg. capsules, bottles of 4's
Adult Dosage: 1 capsule four times daily.

LEDERMYCIN®

LEDERLE LABORATORIES (INDIA) PRIVATE LIMITED
P. O. Box 191, BOMBAY 1.

® Trademark

Your constant assistants—



radiographs made on 'Kodak'X-ray Film... processed in 'Kodak' Tested Chemicals

RADIOGRAPHS rich in detail, correct in contrast—so important in making a correct diagnosis—are yours *every time* you use superior quality 'Kodak' Blue Brand X-ray Film! Properly stored, 'Kodak' X-ray Film comes to you in perfect condition. Processed in reliable 'Kodak' Tested Chemicals, you are assured of highly satisfying results.

'Kodak' X-ray Film and Tested Chemicals are the products of continuous research... carefully quality controlled... made to work together to produce radiographs of maximum diagnostic quality.

We offer expert advice on all technical problems. Write to us for prompt assistance.

Kodak Limited
(Incorporated in England with Limited Liability)
Bombay • Calcutta • Delhi • Madras

Range of 'Kodak' materials and equipment

'Kodak' Blue Brand X-ray Film

'Kodak' Tested X-ray Chemicals: Developing and replenishing powders; fixers; wetting agents—always ready just when you want them

Exposure Equipment: Intensifying screens; X-ray cassettes; etc.

Processing Equipment: Film hangers; film clips; corner cutters; processing tanks; safelight lamps; etc.

Viewing Equipment: X-ray illuminators of various types

Index to Advertisers

	Page
Alembic Chemical Works Co. Ltd.	xii
Allen & Hanburys Ltd.	xxiii
Antiseptic	xxxvi
Bengal Chemical & Pharm. Works Ltd.	Front Cover
Bengal Immunity Co. Ltd.	2nd Cover
Boehringer-Knoll Private Ltd.	ix
Brahmachari Research Institute	xx
Crooks Laboratories Ltd.	xiv
Corn Products Co. (India) Pvt. Ltd.	xviii
Dey's Medical Stores Pvt. Ltd.	xix
Dumex Private Limited	xxxii
Eastern Drug Co. Ltd.	iv
East India Pharmaceutical Works Ltd.	xxiv
Franco-Indian Pharmaceuticals Pvt. Ltd.	vii, xi, xvii
G. D. Pharmaceuticals Private Ltd.	xxii
Gluconate Limited	xxxvi
Glaxo Laboratories (India) Private Ltd.	xii
Hind Chemicals Limited.	xxxviii
Hindustan Lever Limited.	xxxix
Hoechst Pharmaceuticals Private Ltd.	xxix
Indian Health Institute & Labo. Ltd.	3rd Cover
Imperial Chemical Indus. (I) Pvt. Ltd.	x, xxx
International Chemical & Biological Institute Pvt. Ltd.	xxxiii
J. & J. DeChane	xviii
John Wyeth & Brother Limited.	xiii
Kodak Limited	ii
Khatau Vaiabhdas & Co.	xvi
Khandelwal Laboratories Pvt. Ltd.	xi
Lederle Laboratories (India) Pvt. Ltd.	i
May & Baker (India) Private Ltd.	xxxiii
Mysore Industrial & Testing Labo. Ltd.	xxxviii
Navaratna Pharmaceutical Laboratories	3rd Cover
Neo-Pharma Private Ltd.	v
Nestle's Products (India) Ltd.	viii
Oriental Pharmaceutical Industries Ltd.	xiv
Phytosynth Laboratories	3rd Cover
Pfizer Eastern Corporation (Dumex Private Ltd.)	xxv
Parke-Davis India Private Ltd.	xxvi
Raptakos, Brett & Co. Private Ltd.	iii
Ranbaxy & Co. Private Ltd.	xx
Smith, Kline & French (India) Ltd. (Pharmed Pvt. Ltd.)	xiii, xxxv
Sarabhai Chemicals	xv
Smith Stanistreet & Co. Ltd.	xxi
Suhrid Geigy Trading Private Ltd.	xxvii
Sandoz Products Private Ltd.	xxxi
Stadmed Private Limited.	xxxvii
Scientific Publication Concern	xxxviii
Therapeutic Pharmaceuticals	vi
Unichem Laboratories	Back Cover
Uni-U. C. B. (India) Private Ltd.	xxxiv
Voltas Limited	xxviii
V.M. Jani	xxxviii
Veb Carl Zeiss Jena	xxxvii
Zandu Pharmaceutical Works Ltd.	xxii

CONVALESCENT CARE

Whenever an active, well-tolerated and palatable haematinic is required, there is clear indication for the use of

HEPATOGLOBINE

Endorsed by over 25 years' clinical experience

COMPOUND OF LIVER EXTRACT PREDIGESTED PROTEIN AND IRON

25 MCG. OF B_{12} PER OUNCE

Bottle of 300 c.c. (10 oz.)

Particulars from:

RAPTAKOS BRETT & CO., PRIVATE LTD., WORLI, BOMBAY.

During monsoon the atmosphere remains saturated with discomfort and uneasiness. Everybody feels gloomy and depressed with occasional break during sunshine. Nature is not very kind to man now. His foodstuff is easily fermented and water often contaminated. Digestive disturbance is very common in this season. So the need for **BISMOZYME**, the renowned gastro-intestinal regulariser.

Monsoon...

Bismozyme

The gastro-intestinal regulariser

Eastern Drug

EASTERN DRUG CO. LTD.
CALCUTTA-37

Increased Fat Tolerance

by means of

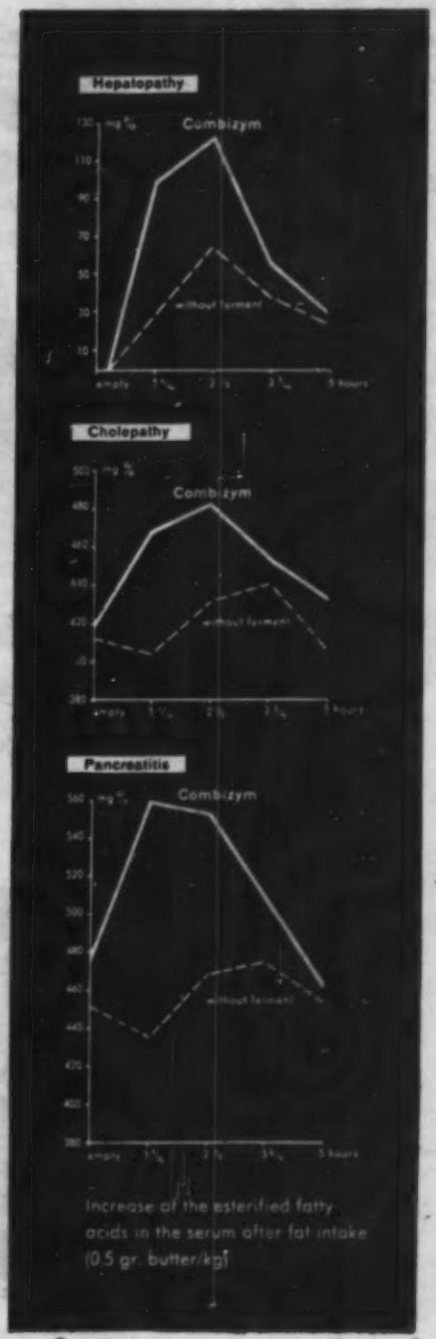
Combizym

Multivalent Digestive Enzyme Preparation

Proteases, lipase, amylase, cellulase and hemicelluloses partly of pancreatic, partly of vegetable origin, standardised of constant enzymatic action

in diseases of the

Liver
Gall Bladder
Pancreas



Increase of the esterified fatty acids in the serum after fat intake (0.5 gr. butter/kg)

Commercial forms:
Packings of 30 and 150 dragées

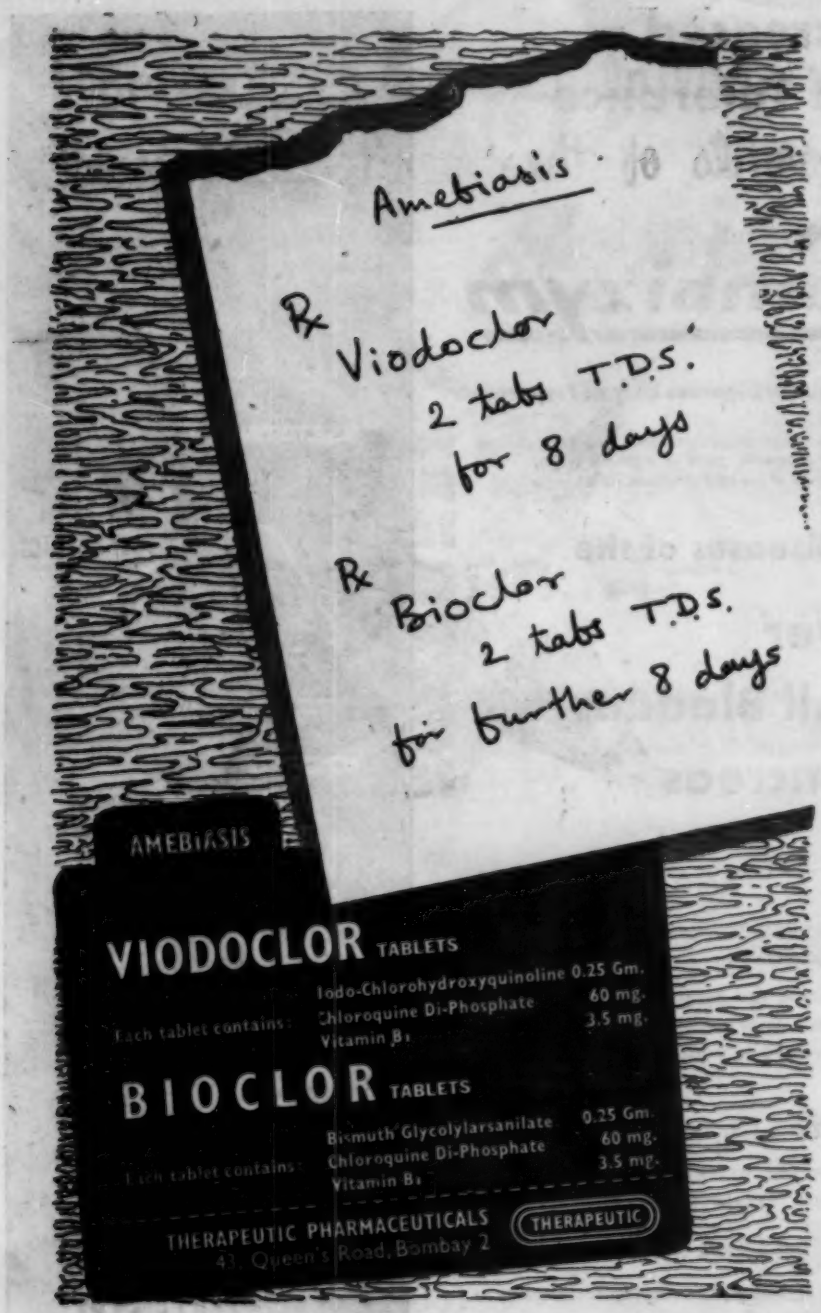
Application and Dosage: During meals, 1 to 2 dragées, to be swallowed whole. In obstinate complaints, 2 to 3 dragées.

LUITPOLD-WERK MUNICH

Detailed literature available from Sole Importers

NEO-PHARMA PRIVATE LIMITED

Kasturi Buildings, Churchgate Reclamation
BOMBAY 1


Amebiasis
℞ Viodoclor
2 tabs T.D.S.
for 8 days
℞ Bioclor
2 tabs T.D.S.
for further 8 days
AMEBIASIS
VIODOCLOR TABLETS
Each tablet contains: Iodo-Chlorohydroxyquinoline 0.25 Gm.
Chloroquine Di-Phosphate 60 mg.
Vitamin B1 3.5 mg.
BIOCLOR TABLETS
Each tablet contains: Bismuth Glycolylarsanilate 0.25 Gm.
Chloroquine Di-Phosphate 60 mg.
Vitamin B1 3.5 mg.
THERAPEUTIC PHARMACEUTICALS
43, Queen's Road, Bombay 2
THERAPEUTIC

essential at the 4 cardinal points of the therapeutic world...

Meprophen combines meprobamate (200 mgs.) with Phenobarbitone (15 mgs.) for greater safety and economy.

It is available in vials of 25 entero-coated tablets.

It is indicated in rheumatismal conditions, premenstrual tension, anxiety states, pre-operative sedation.

Literatures and Particulars from :

FRANCO-INDIAN PHARMACEUTICALS PRIVATE LTD.

Bapnu Ghar, Hornby Vellard, BOMBAY 18.

Second only to mother's milk

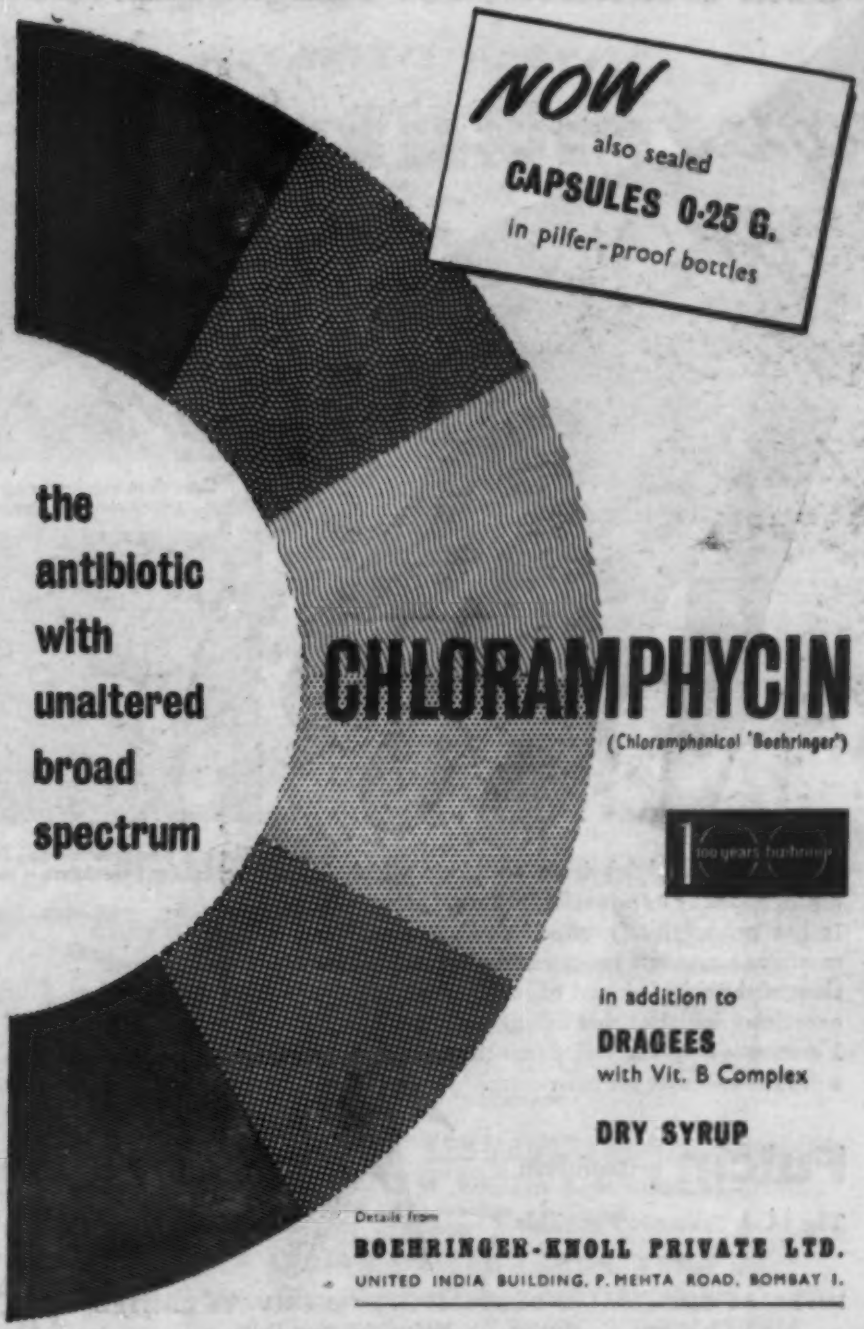
LACTOGEN

A spray dried full cream milk modified so that on reconstitution with water it closely resembles human milk in percentage composition. Fortified by the addition of Vitamins A and D and organic iron, entirely free of pathogens and of excellent digestibility.

NESTLÉ'S PRODUCTS (INDIA) LTD.

P.O. BOX 396, CALCUTTA, P.O. BOX 315, BOMBAY, P.O. BOX 100 MADRAS

LO/P/23



NOW
also sealed
CAPSULES 0·25 G.
in pilfer-proof bottles

the antibiotic with unaltered broad spectrum

CHLORAMPHYCIN
(Chloramphenicol 'Boehringer')

100 years Boehringer

in addition to
DRAGEES
with Vit. B Complex

DRY SYRUP

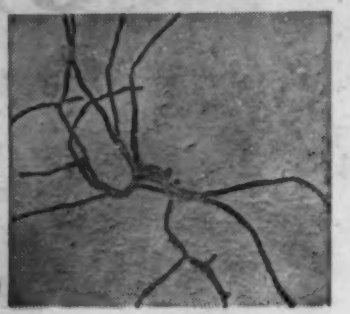
Details from
BOEHRINGER-KNOLL PRIVATE LTD.
UNITED INDIA BUILDING, P. MEHTA ROAD, BOMBAY 1.

Sole Distributors: RALLIS INDIA LIMITED, PHARMACEUTICAL DIVISION, POST BOX NO. 239, BOMBAY 1

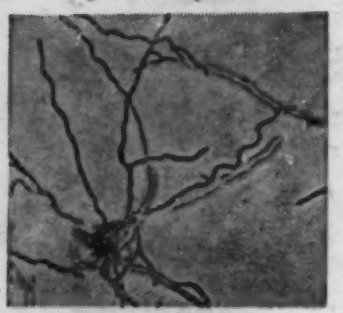
Oral treatment for fungal infection

Trichophyton Rubrum infection of the skin and nails and *Microsporum* infections of the scalp respond readily to treatment with 'Fulcin'.

The effect of 'Fulcin' (griseofulvin) on the hyphae of a fungus growing in a nutrient.



Growth in nutrient with no griseofulvin present.



The effect on growth when 0·1 part per million griseofulvin is present.

The effect on growth when 0·8 part per million griseofulvin is present.

'Fulcin' (griseofulvin) is an antibiotic which is distinguished by its powerful antifungal properties. It has proved highly effective when given by mouth as a systemic treatment for mycotic infections of the skin, hair and nails. Clinical experience indicates that a daily dose of 1 gramme (1 'Fulcin' tablet four times a day) is adequate for most cases.

Fulcin griseofulvin
TRADE MARK

The I.C.I. Systemic Fungicide

IMPERIAL CHEMICAL INDUSTRIES (INDIA) PRIVATE LIMITED
Calcutta Bombay Madras New Delhi

Sole Distributors in India for
IMPERIAL CHEMICAL INDUSTRIES LIMITED
Pharmaceuticals Division, Wilmslow, Cheshire, England

TICF 913

ROUSSEL

A COMPLETE FORMULA !

Cortasmyl

for the DAY TO DAY protection of the ASTHMATIC PATIENT

● SAFE ● EFFECTIVE ● SYNERGISTIC

COMPOSITION
Each tablet contains:

Prednisone	1.5 mg.
Theophylline	80 mg.
Ephedrine Hydrochloride	10 mg.
Phenobarbital	10 mg.

PRESENTATION
Vials of 20 tablets

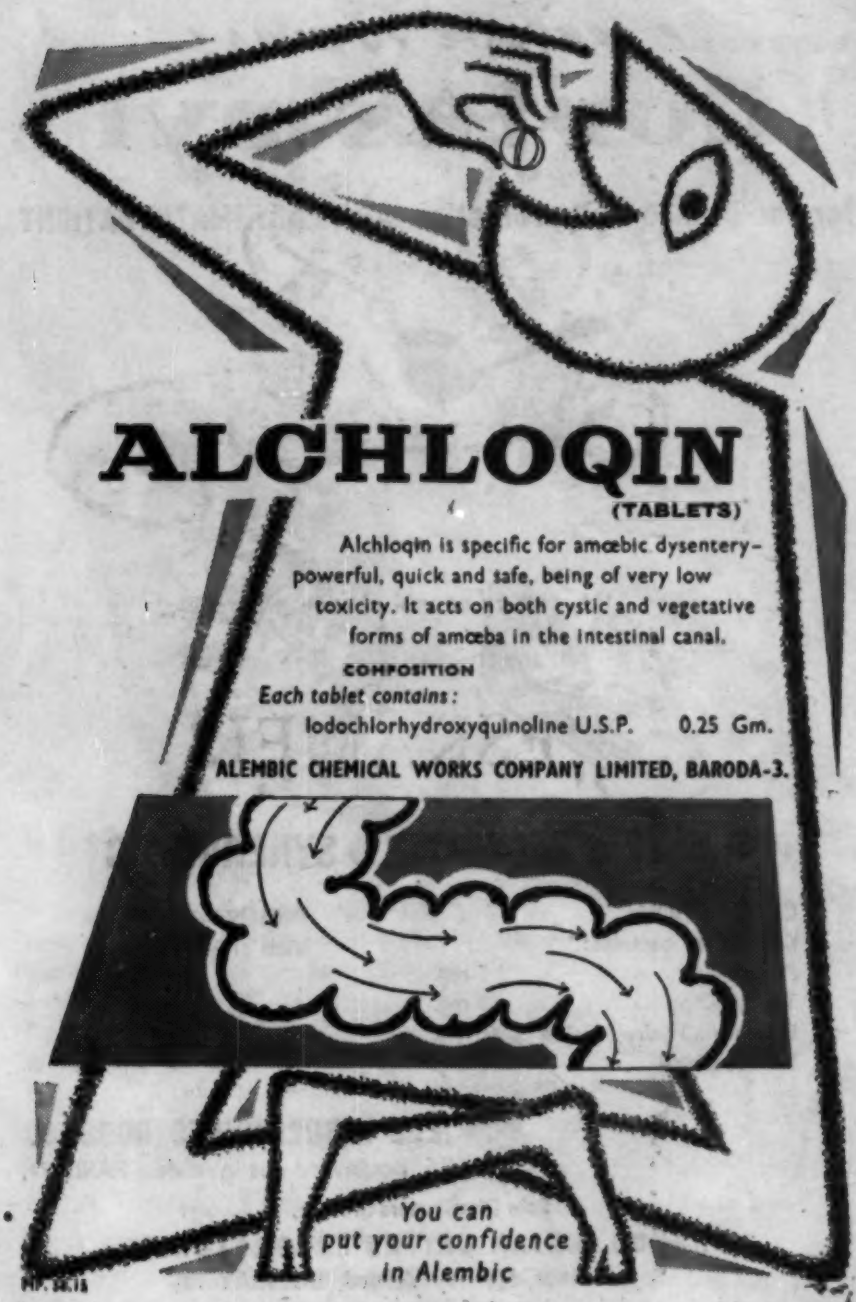
ROUSSEL

LES LABORATOIRES ROUSSEL
35, Boulevard des Invalides, PARIS 7e.

Sole Distributors in India,

FRANCO INDIAN UNITED LABORATORIES
Bapnu Ghar, Hornby Vellard, BOMBAY 18.

ROUSSEL


ALCHLOQIN
(TABLETS)
Alchloqin is specific for amœbic dysentery–powerful, quick and safe, being of very low toxicity. It acts on both cystic and vegetative forms of amœba in the intestinal canal.
COMPOSITION
Each tablet contains:
Iodochlorhydroxyquinoline U.S.P. 0.25 Gm.
ALEMBIC CHEMICAL WORKS COMPANY LIMITED, BARODA-3.
You can put your confidence in Alembic

the leopard cannot change his spots...

but the sufferer from acne can use

'ESKAMEL'

'Eskamel' is specifically designed for the treatment of acne and normally brings marked improvement, not in weeks or months, but in a matter of days. 'Eskamel' is delicately flesh-tinted so that it hides the unsightly acne lesions.

Formula:

Resorcinol 2%, Sulphur 8%, in a stable, grease-free, flesh-tinted vehicle. *Available in 1 oz. tubes.*

ESKAMEL for ACNE

Smith Kline & French (India) Ltd.
(Incorporated in England with limited liability)
141 Fort Street, Bombay-1

DISTRIBUTED BY: Pharmed Private Limited,
Bombay-Delhi-Calcutta-Madras

'Eskamel' is a trade mark Ad:PA10Ind

OPIMYCETIN

SYRUPS, CAPSULES &
COMPOUND CAPSULES

COMPOSITIONS

OPIMYCETIN CAPSULES

Each Capsule Contains :

Chloramphenicol	B. P.	...	0.25 G.

OPIMYCETIN COMPOUND CAPSULES

Each Capsule Contains :

Chloramphenicol	B. P.	...	0.25 G.
Vitamin B_1	B. P.	...	7.5 mg.
Riboflavin	B. P.	...	2 mg.
Vitamin B_6	B. P. C.	...	0.3 mg.
Niacinamide	B. P.	...	15 mg.

OPIMYCETIN SYRUP

Each 30 ml. Contains :

Synthetic Chloramphenicol Palmitate equivalent to 1.0 G. of Chloramphenicol B. P.			
Glycerine	B. P.	...	0.3 ml.
Flavoured Syrupy base		...	q. s.

INDICATIONS

Typhoid, Rickettsia infections, undulant fever, Rocky Mountain fever, infections of the urinary tract, atypical pneumonia, psittacosis, veneral lymphogranuloma, petussis.

PACKINGS

OPIMYCETIN PLAIN AND COMPOUND CAPSULES
In Bottles of 12 and 100 Capsules.

OPIMYCETIN SYRUP
In Bottles of 50 ml. and 400 ml.

OPII ORIENTAL PHARMACEUTICAL INDUSTRIES LTD.
64-66, TULSI PIPE ROAD, MAHIM, MOMBAY 16

HYDROCORTISONE
LACTO-CALAMINE

the accepted treatment for inflammatory dermatoses

the well-known topical application soothing, protective

together in...

Cortoderma

The Lacto-Calamine base in Cortoderma protects patients from the risk of sensitisation attributed to some vehicles. (Practitioner, 1955, 175, 575)

CORTODERMA is available in 10 gramme tubes containing either 0.5% or 1.0% hydrocortisone acetate in a cream base of Lacto-Calamine.

THE CROOKES LABORATORIES LIMITED (Incorporated in England: The Liability of Members is Limited) Court House, Carnac Road, Bombay 1.

the most effective topical corticosteroid known... providing unexcelled safety...

Kenalog-S

Squibb Triamcinolone Acetonide with Neomycin and Gramicidin (Spectrocin)

Ointment: skin • ophthalmic/ Lotion

Anti-inflammatory • Antipruritic
Antiallergic • Antibacterial

- prompt, dramatic response—the most effective topical corticosteroid known
- unexcelled safety
- itching and inflammation rapidly relieved
- secondary bacterial infection readily controlled
- Spectrocin extremely well tolerated
- more complete clearing than with other topical corticosteroids
- clinically superior to hydrocortisone
- effective in resistant cases

SUPPLY: Tubes of 5 Gms.
Ophthalmic, tubes of 3.5 Gms.
Squeeze type bottles of 15 ml.

Also available: **KENALOG-SM** (Squibb Triamcinolone Acetonide with Spectrocin and Mycostatin)

SQUIBB *A century of experience builds faith*

SARABHAI CHEMICALS BARODA
Manufacturers of Squibb Medicinals in India

A PRODUCT OF DR. A. WANDER S. A., BERNE (SWITZERLAND)

a well tolerated preparation for all infections of the intestines

Each tablet contains:
Phthalylsulphathiazole B.P. .. 0.49 G
Ethoxydiamino-acridine lactate .. 10 mg.
Available in convenient Strip packings of 6 and 12 tablets. Tubes of 20 tablets.

Sulfotalil
WANDER

For Medical literature, samples & supplies please contact:
Sole Distributors:
KHATAU VALABHDAS & COMPANY
Indian Globe Chambers, Fort Street, BOMBAY-1.
Telephone: 261655. Telegrams: "SCARLET"

KV 2 SEKAI

anti-influenzal

antipyretic

analgesic

New, synthetic derivative containing:- Ethylphenyl(1) dimethyl(2-3) dimethylamino(4) pyrazolone 0.4 Gr. per tablet. Indicated in muscular, rheumatic, post-operative and other pains, influenza and fever. Available in cartons of 16 tablets and bottles of 100 tablets.

FRIPYRINE

Particulars from

FRANCO-INDIAN PHARMACEUTICALS PVT. LTD.,

BAPNU GHAR, HORNBY VELLARD, BOMBAY-18

Technical Advisers: **LATEMA, 31 rue de Lisbonne, Paris**

Avoid Substitutes!

Protect your patient by prescribing Glucose Powder by name

DEXTROSOL
is Anhydrous Dextrose, conforming to the U.S.P. and B.P. standards, its chemical formula being $C_6H_{12}O_6$

GLUCOVITA
Every 100 parts contain:
Dextrose Monohydrate...99.4 (Purified glucose)
Calcium Glycerophosphate . 0.2
Calcium Phosphate 0.4
Each ounce of Glucovita is fortified with 250 I.U. of Vitamin-D (Calciferol)

Remember the names

DEXTROSOL and GLUCOVITA

CORN PRODUCTS CO. (INDIA) PRIVATE LTD.

Agents for India: Parry & Co. Ltd.

Composition: 100 gms. contain:

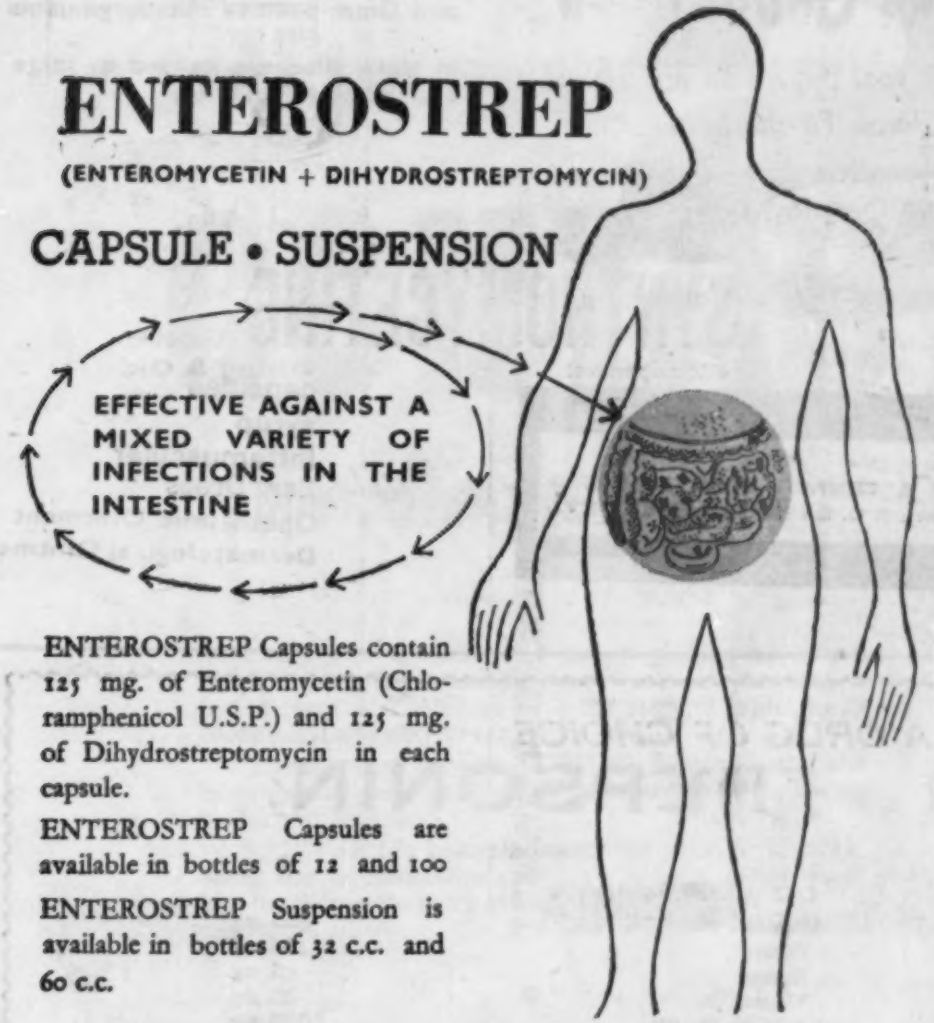
Calcium Lactate	...	5.71 gms.
Dicalcium Phosphate	...	3.43 gms.
Magnesium Phosphate	...	1.41 gms.
Asgandh	...	6.00 gms.
Isharmul	...	2 gms.
Brahmi	...	2 gms.
Talispatra	...	2 gms.
Thiamine Hydrochloride	...	38 mgms.
Riboflavin	...	24 mgms.
Niacinamide	...	276 mgms.
Ascorbic Acid	...	436 mgms.

with traces of Copper and Iron.

ENTEROSTREP

(ENTEROMYCETIN + DIHYDROSTREPTOMYCIN)

CAPSULE • SUSPENSION



ENTEROSTREP Capsules contain 125 mg. of Enteromycetin (Chloramphenicol U.S.P.) and 125 mg. of Dihydrostreptomycin in each capsule.

ENTEROSTREP Capsules are available in bottles of 12 and 100

ENTEROSTREP Suspension is available in bottles of 32 c.c. and 60 c.c.

Manufactured by DEY'S MEDICAL STORES (Mfg.) PRIVATE LTD.
CALCUTTA-11

Under Licence from G. ZAMBON & CO. S. p. A. (ITALY)

Exclusive Distributors DEY'S MEDICAL STORES PRIVATE LTD.
CALCUTTA • BOMBAY • DELHI • MADRAS
PATNA • GAUHATI • CUTTACK

ENT-2/60

in all infections due to Gram-negative and Gram-positive microorganisms

in some diseases caused by large viruses and Rickettsia

SYNTHOMYCETINE Lepetit

chloramphenicol

Sole Distributors in India
RANBAXY & COMPANY PRIVATE LIMITED
Head Office : P. O. Box No. 104, NEW DELHI - 1.

Lepetit

capsules
syrup
intramuscular
Ear Drops
Ophthalmic Ointment
Dermatological Ointment

A DRUG OF CHOICE

PEPSONIN.

COMPOSITION :

One ounce Contains :

Pepsin	..	..	600 mg.
Papain	..	..	120 mg.
Rennin	..	..	45 mg.
Vitamin B_1	..	..	25 mg.
Acid N. M. Dil.		..	0.25 c.c.
Lactic Acid	..	..	0.5 minim
Tinc. Nux Vomica	..	..	5 minim
Alcohol	..	..	12.5% v/v.

Sweet flavoured in palatable base.

INDICATION :

Pepsonin a gastric tonic and stimulant, is useful in the treatment of the disturbances of the digestive tract, Indigestion, Dyspepsia Gastritis etc.

THE BRAHMACHARI RESEARCH INSTITUTE
82/3, CORNWALLIS STREET, CALCUTTA-4.
Phone : 55-1363 Gram : "STIBINOL"

TODAY'S MOST PRACTICAL PRESCRIPTION

CONTAB

CONTRACEPTIVE TABLETS

You may now offer married people seeking advice on planned parenthood today's most practical prescription in the form of CONTAB—a contraceptive tablet, both economical and easy to use.

Physiologically sound, CONTAB is trustworthy and harmless and provides that assurance necessary for lasting health and hapiness.

CONTAB has been perfected after years of research When our representative calls on you next, please allow him to tell you the story of CONTAB.

●

SMITH STANISTREET & CO. LTD.

HEAD OFFICE, FACTORY & LABORATORIES, 18 CONVENT ROAD, CALCUTTA—14.

PLSY 49

A NEW INTRODUCTION

a palatable **NEOMYCIN**
and sulphonamides suspension
with pectin and kaolin

JIDIMYCIN

active against specific and non-specific

DIARRHŒA

●

Manufactured by

G. D. Pharmaceuticals Private Ltd.
11/1 Nivedita Lane . Calcutta 3

COMPOSITION :	
Neomycin Sulphate B.P.	0.30 gm.
Containing 0.21 Gm. Neomycin Base	
Succinyl Sulphathiazole B.P.	3.00 gm.
Phthalyl Sulphathiazole B.P.	1.50 gm.
Pectin N.F.	0.30 gm.
Kaolin B.P.	2.70 gm
Sodi Benzoate B.P.	0.35%
Syrup, flavouring etc. upto	30 c.c.

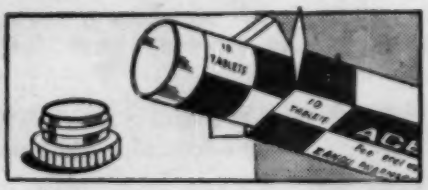
eduris/60

New
Diuretic Drug
For Oral Administration

ACETAZOLAMIDE
TABLET

Useful for patients with congestive Cardiac Failure. In Nephritis, Nephrosis and Hepatic Cirrhosis, Toxaemias of Pregnancy and in Premenstrual tension. Very useful in Glaucoma.

ZANDU PHARMACEUTICAL WORKS LTD.
Gokhale Road South,
Bombay 28



Graphic Z 36

In chronic bronchial asthma and emphysema

CHOLEDYL*

before CHOLEDYL		after CHOLEDYL
	reduces the need for aerosol therapy	
	reduces coughing	
	increases vital breathing capacity	

- provides a degree of effectiveness that cannot be obtained from aminophylline
- increases cardiac output
- stimulates the respiratory centre
- prevents bronchospasm without central nervous stimulation
- helps relieve the interstitial œdema
- is well tolerated
- maintains efficacy during prolonged administration

LITERATURE ON APPLICATION

Choledyl is available in tablets containing 100 mg. and 200 mg. choline theophyllinate B.P.C. and is supplied in bottles of 100 tablets.

Manufactured in India by: ALLEN & HANBURYS LTD. BOMBAY 1

*under licence from WARNER-LAMBERT PHARMACEUTICAL COMPANY, NEW JERSEY, U.S.A., owners of the trade mark and patents. Patents granted: India 50,707; U. of S. Africa 22,325; U. K. 736,443.

N 58/100/H/IND

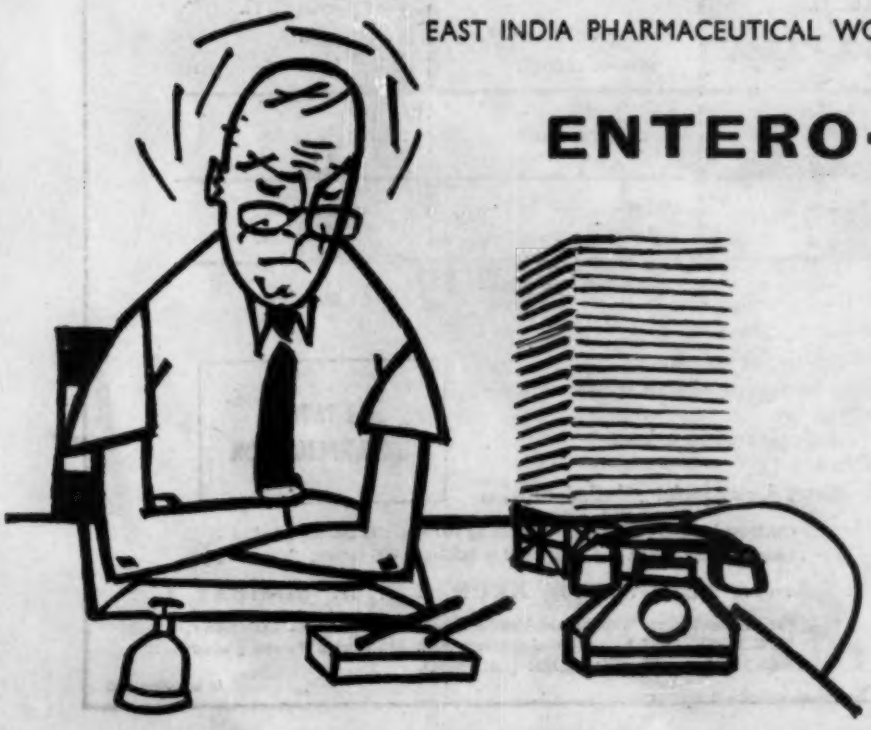
TONOFERON

ELIXIR OF COLLOIDAL IRON, VITAMIN B_{12} AND FOLIC ACID.

For quick response in the treatment of iron deficiency anæmia.

EAST INDIA PHARMACEUTICAL WORKS LTD., CALCUTTA-26

ENTERO-QUINOL



For intestinal disorders

EIPW/MA/30

Journal of the Indian Medical Association

VOLUME 35 NUMBER 3 — PUBLISHED TWICE A MONTH — CALCUTTA AUGUST 1, 1960

EDITOR—P. E. GUHA, M.B., M.R.C.S. (ENG.), D.O.M.S. (LOND.)

ORIGINAL ARTICLES

ANAEMIA IN INDUSTRIAL WORKERS OF KANPUR

R. K. THAPAR, M.D. (MEDICINE)

Parabganj, Gonda, U. P.

INTRODUCTION

That industrial work and environment adversely affected the metabolism of workers was suspected as far back as 1886. In Britain, an enquiry was instituted by the Parliament to investigate if the health of workers in card-rooms and weaving-sheds of textile factories was in any way affected by the industrial environment. The result of the enquiry was inconclusive. But another such enquiry held in 1927 revealed that industrial environment might affect the health of the workers. Haemoglobin surveys were carried out in U.K. in 1943. In India investigations were made on anaemias in the industrial towns of Jamshedpur, Calcutta, Assam, Bombay, and South Indian Cotton Mills at Madurai. No investigation has so far been made in the industrial town of Kanpur.

Theories have been advanced to explain the high incidence of anaemia in industrial workers, ranging from hookworm and dietary factors to malaria and environmental factors. This enquiry was started to answer the following questions:

1. Incidence of anaemia in industrial population of Kanpur, with special reference to the textile industry.

2. Whether the industrial workers were more affected than non-industrial population of the same social status.

3. In how many cases was the industry responsible for the causation of anaemia, after excluding all the factors which can otherwise produce anaemia.

4. To discuss certain common factors which might be responsible for producing anaemia in industrial as well as rural population.

5. In how many cases known industrial poisons, such as lead etc., are responsible for the anaemia.

MATERIAL AND METHODS

Group 1—In order to establish the normal haematological standard in persons of the same social status as the industrial workers, 310 healthy persons who had come for employment from the villages were examined at random. They were collected through the Employment Exchange, viz., from those persons who had applied for employment in industry. They were mostly agriculturists.

Group 2—In order to find out the haematological data in industrial workers, 801 healthy workers were collected at random from the various departments of different industries, chiefly textiles. The object was to survey nearly ten per cent of the industrial population of Kanpur. They were examined while working in the mills and the blood was collected in oxalate tubes and laboratory investigations were made by the writer.

Subjects of both the groups had to answer a detailed questionnaire, which was followed by a thorough clinical examination to exclude any disease which could be the cause of the anaemia, e.g., history of piles in male, and menorrhagia in female subjects. The following routine investigations were carried out:

1. Red cell count, by 2 pippete method.
2. Haemoglobin, by Sahli's haemoglobinometer.
3. Haematocrit, the different absolute values.
4. Total and differential leucocyte counts.
5. General blood picture, from the slide.
6. Reticulocyte count.
7. Urine examination.
8. Other special investigations, including urine examination for caproporphyrin—III excretions in workers exposed to lead, punctate basophil count in above workers, fractional test meal in selected cases. Therapeutic response was also observed in selected cases of anaemia.

The present paper is based on a study conducted at Kanpur from June, 1954 to April, 1957.

The results of investigations are discussed under three headings, viz., haematological, clinical, and pathological.

A. Haematological Aspects

(a) Incidence of anaemia:

1. *Anaemia in male industrial population*—Persons employed in industry have average R.B.C. count and Hb. value and P.C.V. below normal, as compared with non-industrial people of the same social status (Table 1). Reticulocyte count was 2 per cent as compared with 1·2 per cent in the control group.

Ling (1937) has listed anaemia as an important cause of industrial sickness, equal to industrial accidents. Row (1951) found R.B.C. count in South Indian textile workers in Madurai (males) to be 3·27 mill./c.mm. and Hb. value 10·81 g./100 c.c. These figures were the average for affected cotton workers. In normal cotton workers he found average R.B.C. count to be 3·47 mill./c.mm. and Hb. value 10·3 g/100 c.c. He did not however compare the figures with those in the control.

2. *Anaemia in non-pregnant female industrial population*—Female industrial workers had red cell counts and Hb. values and P.C.V. less than those of the control (Table 2). Reticulocyte count was 1·5 per cent as compared with 2 per cent of the control.

Napier and Das Gupta (1937) showed that female industrial workers in tea gardens were mostly anaemic. The R.B.C. count of normal (non-pregnant) female Assam coolies was 5·25 mill./c.mm., and Hb. value 13·34 g./100 c.c. They reported reticulocyte count within range of 0·7-9·6 per cent and mean 4·26 per cent. Mean for the control group was 2·17 per cent. In another series they gave the figures for normal non-pregnant females as R.B.C. count, 4·55 mill./c.mm., Hb. value 10·8 g/100 c.c. and P.C.V., 34·6, which tally with the findings in our control group.

3. *Anaemia in (pregnant) female industrial population*—Industrial pregnant women are more anaemic than non-industrial pregnant women (Table 3). Very often these patients did not complain of ill health, unless specially asked. Later many women complained of fatigue, vague pains, dyspnoea and soreness of the mouth. Reticulocyte count was equal in both groups.

Napier and Bilimoria (1937) studied anaemia in pregnant industrial workers of Assam and found a severe hyperchromic anaemia in 16 per cent and of lesser grade in 21 per cent. They also found orthochromic anaemia in 12 per cent and hypochromic anaemia in 51 per cent of pregnant industrial workers. They found average R.B.C. count in mill./c.mm. as 4·65 and Hb. value as 10·7 g./100 c.c., P.C.V. as 32·8 and reticulocyte as 2·1. They did not find koilonychia in any of their cases.

Table 1—Showing Red Blood Cell Count and Haemoglobin Value and P.C.V. in Male Industrial Workers

Groups	No. of cases	R.B.C. (mill./c.mm.)		Hb. (g./100 c.c.)		P.C.V.	
		Average	Range	Average	Range	Average	Range
Industrial population ...	745	4·12	1·88—5·21	12·63	5·4—17·7	37	20—49
Control (rural)	271	5·12	2·8 —5·9	14·5	7·5—18·75	44·5	30—53

Table 2—Showing R.B.C. Count, Hb. Value and P.C.V. of Non-pregnant Industrial Women

Groups	No. of cases	R.B.C. (mill./c.mm.)		Hb. (g./100 c.c.)		P.C.V.	
		Average	Range	Average	Range	Average	Range
Industrial women	30	3·95	2·7 —3·5	12·6	6—14·3	33·3	21—46
Control	30	4·5	2·22—5·02	14·0	7—18·75	40	24—50

TABLE 3—SHOWING R.B.C. COUNT, HB. VALUE AND P.C.V. OF PREGNANT INDUSTRIAL WOMEN

Groups	No. of cases	R.B.C. (mill./c.mm.)		Hb. (g./100 c.c.)		P.C.V.	
		Average	Range	Average	Range	Average	Range
Pregnant industrial women	26	3·93	2·58—5·1	11·42	6 —14·6	33	23—42
Pregnant non-industrial control	26	4·2	2·67—4·92	13·2	7·7—15·9	37	26—45

TABLE 4—SHOWING PERCENTAGE DISTRIBUTION OF MALE INDUSTRIAL WORKERS IN DIFFERENT R.B.C. GROUPS

Groups	No. of cases	R. B. C. groups (in mill./c. mm.)					
		0—3·4	3·5—3·9	4—4·4	% below 4·4	4·5—4·9	5—5·4
Industrial	745	27	15	16	58	24	18
Rural	271	5	5	19	29	34·5	36·5

TABLE 5—SHOWING NUMBER OF MALE INDUSTRIAL WORKERS IN DIFFERENT HB. GROUPS

Groups	No. of cases	Hb. groups (in g./100 c.c.)							
		0 to 8·9	9 to 9·9	10 to 10·9	11 to 11·9	12 to 12·9	% below 13	13 to 13·9	14 to 14·9	% above 13
Industrial	745	36	116	58	58	194	61	124	169	39
Rural	271	9	4	18	18	26	28	41	155	72

TABLE 6—SHOWING NUMBER OF FEMALE INDUSTRIAL WORKERS IN DIFFERENT R.B.C. GROUPS

Groups	No. of cases	R. B. C. groups (in mill./c. m. m.)						
		0 to 3·4	3·5 to 3·9	4 to 4·4	% below 4·5	4·5 to 4·9	5 to 5·4 or over	% above 4·5
Workers	30	12	6	2	62	4	6	38
Control	30	4	—	6	33	8	12	67

(B) ANAEMIA IN INDUSTRY:

1. *Male workers*—R.B.C. count below 4·5 mill./c.mm. in males and 4 mill./c.mm. in pregnant females and Hb. value below 13 g./100 c.c. in all (Indian Standard, 15 g.) were considered to be an arbitrary index of anaemia and from this the number as anaemic persons was calculated in both the groups.

Fifty-eight per cent of the industrial workers in this series had R.B.C. count below 4·5 mill./c.mm., while only 29 per cent of non-industrial workers had R.B.C. count below 4·5 mill/c.mm.—showing that double the number of industrial workers had R.B.C. count less than 4·5 mill./c.mm. (Table 4).

Haemoglobin value was deficient in a greater percentage of industrial workers than in the control (Table 5). But the fall in Hb. value was proportional to the fall in R.B.C. count.

Working with industrial workers in Assam, Wilson and Mitra (1938) have shown that they are mostly anaemic. MacDonald (1939) reported that anaemia is very common and responsible for 6 per cent mortality among tea estate labourers in Assam.

Napier and Das Gupta (1945) report a high percentage of anaemia in industrial workers of Calcutta.

During their survey of factory workers in Bombay, de Mello *et al* (1950) have reported that 50 per cent of them were anaemic. They also found anaemia present in the normal population.

2. *Female workers*—In our series, female workers in industry showed a greater incidence of anaemia than females not engaged in industry (Table 6).

TABLE 7—SHOWING NUMBER OF FEMALE INDUSTRIAL WORKERS IN DIFFERENT HB. GROUPS

Groups	No. of cases	Hb. groups (in g./100 c.c.)							
		7 to 8·9	9 to 9·9	10 to 10·9	11 to 11·9	12 to 12·9	13 to 13·9	14 or over	% above 13
Industrial ...	30	4	4	1	1	9	7	4	37
Control ...	30	—	4	4	2	—	4	16	68

TABLE 8—SHOWING NUMBER OF PREGNANT INDUSTRIAL WORKERS IN DIFFERENT R.B.C. GROUPS

Groups	No. of cases	R. B C. (in mill./c. mm.)						
		Up to 3·4	3·5 to 3·9	% below 4	4 to 4·4	4·5 to 4·9	5 or over	% above 4
Pregnant	26	10	7	63	4	3	2	37
Control	26	4	2	23	—	8	12	77

While discussing the haematology of women industrial workers in Assam, Napier and Das Gupta (1937) showed that they were mostly anaemic.

Females have a higher incidence of anaemia than male industrial workers which may be due to the added burden of menstruation and pregnancy (Mitra, 1939).

In our series 63 per cent of industrial workers as compared with 32 per cent of the control group have haemoglobin less than 13 g. (Table 7).

Napier and Das Gupta (1945) quoted middle class women of Calcutta in the age group 14 to 38 to have 12·63 g./100 c.c. of Hb. Delhi middle class women have 13·11 g./100 c.c. of Hb.

3. *Anaemia in industry (pregnant females)*—In our series pregnant industrial workers have a higher incidence of anaemia than non-pregnant industrial workers on the one hand and between industrial workers and control group on the other (Table 8). The first can be explained by pregnancy and the latter by some industrial factors to be discussed later.

Napier and Bilimoria (1937) in their survey of anaemia in pregnant industrial workers showed that nearly all of them (52) had anaemia, varying from mild to severe variety. In Assam, pregnant women workers have Hb. value of 10·70 g./100 c.c. while in South Coonoor a mixed population had 15·52 g./100 c.c.

(c) ANAEMIAS IN DIFFERENT INDUSTRIES :

Metal workers including lead workers in our series have the lowest red cell count and Hb. level. Next come workers in the textile, chemical and oil and tannery industries (Table 9).

It is probable that absorption of lead play a role in the production of low red cell count in workers exposed to the metal. This is shown by caproporphyrin III excretion in urine.

TABLE 9—SHOWING AVERAGES OF R.B.C., HB. AND P.C.V. IN MALE WORKERS FROM VARIOUS TYPES OF INDUSTRIES

Occupation	Average red cell (mill./c.mm.)	Average Hb. (g./100 c.c.)	P.C.V.	No. of cases	Percentage of anaemics
Textile	4·13	11·91	36·8	650	71
Chemical	4·20	12·76	43·2	36	50
Metal	4·00	11·00	33·8	97	73
Oil, tannery	4·15	12·05	38·6	45	50
Rural (Control)	5·12	14·5	45·5	271	29

Workers handling chemicals are also anaemic, as compared with the rural group.

More than 50 per cent of all types of industrial workers in this series have red cell count below 4·5 mill./c.mm. compared to 29 per cent in the control group. 73 per cent of metal workers have red cell count below 4·5 mill. which is a higher figure compared to other workers (Table 10).

TABLE 10—SHOWING PERCENTAGE DISTRIBUTION OF INDUSTRIAL WORKERS IN DIFFERENT RED CELL GROUPS

Occupation	No. of cases	Below 4 mill./c.mm.	4 to 4·5 mill./c.mm.	Below 4·5 mill./c.mm.	4·5 to 4·9 mill./c.mm.	5 or over mill./c.mm.
Textile ...	650	42	29	71	13	16
Chemical ...	36	25	25	50	50	—
Metal ...	97	33	40	73	23	4
Oil & Tannery	45	20	20	40	30	30
Rural (Control)	27	10	19	29	3	68

TABLE 11—SHOWING PERCENTAGE OF MALE WORKERS IN DIFFERENT INDUSTRIAL OCCUPATIONS IN DIFFERENT HAEMOGLOBIN GROUPS

Occupation	Hb. 8 to 8·9	Hb. 9 to 9·9	Hb. 10 to 10·9	Hb. 11 to 11·9	Hb. 12 to 12·9	Hb. 8 to 13	Hb. 13 to 13·9	Hb. 14 or over	Total No. of workers
Textile	10	13	3	3	28	67	24	9	550
Chemical	12	20	3	—	15	50	20	30	36
Metal	11	5	9	25	25	75	15	10	97
Oil and Tannery ...	6	10	4	10	10	40	40	20	45
Rural (Control) ...	3	7	2	7	9	28	5	68	271

Mitra (1940) working among iron and steel workers at Jamshedpur found a high incidence of anaemia. He found their nutritional status rather poor. He could not, however, correlate the anaemia with the diet in many of the cases, indicating that some other factors may be implicated.

27 per cent of non-industrial workers had Hb. below 13 g. Workers handling metals had the lowest Hb. which may be due to the effect on their system of heavy metals like lead, while textile workers had 67 per cent of workers whose Hb. was below 13 g., oil and tannery workers had 40 per cent of their workers with Hb. below 13 g. (Table 11).

Khan (1951) giving an analysis of 24 iron and steel workers at Jamshedpur showed 5 in 13 to 13·9 Hb. group, 7 in 14 to 14·9, 11 in 15 to 15·9, 1 in 16 to 16·9 group.

(D) SEVERITY OF ANAEMIA :

Anaemia has been classified into 3 grades, viz., (1) mildly anaemic (+), (2) moderately anaemic (++), and (3) severely anaemic (+++).

1. *Males*—In our series the incidence of anaemia in workers was nearly 4 times in severely anaemic (+++) group. Industrial workers were even more involved in moderately anaemic (++) group and non-industrial workers who were anaemic were mostly in mild (+) group (Table 12A).

TABLE 12A—SHOWING PERCENTAGE INCIDENCE OF ANAEMIA IN INDUSTRIAL WORKERS GROUPED ACCORDING TO SEVERITY

Groups	No. anaemic	Anaemia		
		Mild (+)	Moderate (++)	Severe (+++)
Industrial	432	61	20	19
Control	78	89	6	5

Besides other factors which might be causing the mild degree of anaemia, industry seem to play an important role in the causation of anaemia.

2. *Females (non-pregnant)*—In our series there was greater incidence of severe anaemia in industrial workers as compared with anaemic control (Table 12B).

TABLE 12B—SHOWING PERCENTAGE DISTRIBUTION OF ANAEMIA IN FEMALE INDUSTRIAL WORKERS

Groups	No. anaemic	Anaemia		
		Mild (+)	Moderate (++)	Severe (+++)
Industrial	20	10	30	60
Control	10	60	20	20

3. *Females (pregnant)*—In our series a severe type of anaemia was noticed among pregnant workers (Table 12C).

TABLE 12C—SHOWING PERCENTAGE DISTRIBUTION OF ANAEMIA IN PREGNANT INDUSTRIAL WORKERS

Groups	No. anaemic	Anaemia		
		Mild (+)	Moderate (++)	Severe (+++)
Industrial	17	20	32	48
Control	6	40	40	20

Mitra (1939) working with pregnant industrial workers in Assam found a severe type of anaemia in them.

(E) TYPES DISTRIBUTION OF ANAEMIA :

TABLE 13—SHOWING MALE ANAEMIC WORKERS IN DIFFERENT INDUSTRIES

Occupations	Total No. anaemic	Anaemia		
		Microcytic hypochromic %	Normocytic normochromic %	Macrocytic hypochromic %
Textile	385	28	66	6
Chemical	18	39	60	1
Metal	73	25	70	5
Oil and Tannery	18	38	60	2
Rural (Control)	78	82	16	2

1. *Males*—Normocytic anaemia predominated in this series, while in the control anaemic group, microcytic type was common (Table 13). This means that anaemia in industrial workers is due to some factor causing depression of the bone marrow.

2. *Females*—Females (excluding pregnant) workers have a greater incidence of anaemia as compared with males and pregnant females (Table 14).

TABLE 14—SHOWING PERCENTAGE DISTRIBUTION OF ANAEMIC CASES WITH THE TYPE OF ANAEMIA

Types of anaemia	Males	Females	Pregnant females
Hypochromic macrocytic ...	3	5	8
Hypochromic microcytic ...	32	38	30
Normochromic normocytic ...	65	57	62

Napier and Das Gupta (1935) working with industrial workers in Assam found 2 cases of macrocytic type in their series of 58 cases, and 2 cases out of 33 definitely hypochromic anaemia in their second series, 32 were microcytic.

(F) DIFFERENT DEPARTMENTS IN TEXTILE INDUSTRY AND THE RELATION OF ANAEMIA TO INDUSTRY (MALES):

Only 29 per cent of workers, in which all possible causes of anaemia including hookworm were excluded, are classified below according to different departments of the textile industry (Tables 15A and 15B.).

TABLE 15A—SHOWING THE EFFECT ON RED CELLS (MILL./C.MM.) OF WORKERS IN DIFFERENT DEPARTMENTS

Departments	% 0 to 2·9	% 3 to 3·4	% 3·5 to 3·9	% 4 to 4·4	Below 4·5 No.	Total No. of workers
Coolies	—	—	40	60	16	46
Bale breaking ...	—	1	10	90	18	49
Blowing	26	28	26	20	27	44
Carding	26	16	36	22	39	50
Drawing	—	50	—	50	16	46
Spinning	—	25	50	—	39	45
Winding	50	30	20	—	38	43
Sizing	1	—	50	50	28	47
Weaving	4	66	—	30	37	42
Dyeing	50	25	—	25	45	48
Bleaching	75	—	—	25	39	41
Finishing	25	—	50	25	43	49
				Total ...	385	550

TABLE 15B—SHOWING DISTRIBUTION OF DIFFERENT DEPARTMENTAL WORKERS OF TEXTILE INDUSTRY (MALES) IN VARIOUS HAEMOGLOBIN GROUPS (IN G./100 C.C.)

Departments	Hb. 0 to 8·9 %	Hb. 9 to 9·9 %	Hb. 10 to 10·9 %	Hb. 11 to 11·9 %	Hb. 12 to 12·9 %	Hb. below 13 No.	Total No. of workers
Coolies ...	—	—	—	60	40	18	46
Bale breaking	—	—	—	50	50	19	49
Blowing ...	—	—	—	20	80	35	44
Carding ...	32	—	48	16	4	34	50
Drawing ...	—	—	20	20	60	14	46
Spinning ...	—	—	25	25	25	36	45
Winding ...	50	50	—	—	—	35	43
Sizing ...	—	—	20	50	30	21	47
Weaving ...	34	—	33	33	—	40	42
Dyeing ...	—	—	50	50	—	45	48
Bleaching ...	—	—	50	—	50	40	41
Finishing ...	—	—	50	25	25	41	249
				Total ...		378	550

1. Workers in spinning, carding, winding and weaving departments have got a lower R.B.C. count.

2. Coolies, bale workers, sizing workers had a higher count and less number of anaemic persons.

3. Workers exposed to metallic poisons in bleaching and dyeing departments had a very low count compared to other workers. The dust in dyes, specially in coal-tar dyes, and those emanating from such mordants as arsenite of sodium are dangerous. This high incidence of anaemia may be due to haemolytic poisons used in these departments, consisting of aniline dyes, lead paints, etc. This shows how workers, without the use of a mask, are exposed.

Working conditions are uncomfortable in spinning, carding, weaving and winding sheds departments because of the most dusty and humid atmosphere. Here, the workers have a red cell count much lower than is obtained in other departments.

It has been contended that artificial humidification of the weaving shed is prejudicial to health.

The parliamentary enquiry in Great Britain of 1890 published inconclusive results. But in 1927 it reported that this condition did have some injurious effect.

The atmosphere of blow rooms though not humid was found to be extraordinarily dusty and stagnant and indirectly uncomfortable. Blow room workers mostly have R.B.C. count below 4·5 mill/c.mm. and Hb. value below 13 g./100 c.c.

Defective movements of air is due to ineffective system of air supply and unsatisfactory ventilation of the room. This leads to stagnation of air, making certain places more uncomfortable than the rest.

(G) ANAEMIA IN INDUSTRY AND ITS RELATION TO THE AGE OF WORKERS (TABLES 16, 17 AND 18):

There was a fall of R.B.C. count below normal, particularly between 25 and 50 years but as shown later, by comparison with controls, it is due to increased length of employment in industry which occurs with advancing age.

TABLE 16—SHOWING DISTRIBUTION OF INDUSTRIAL WORKERS IN DIFFERENT AGE GROUPS WITH HAEMOGLOBIN IN G./100 C.C.

Age group	No. of cases	Hb. 0 to 8·9 %	Hb. 9 to 9·9 %	Hb. 10 to 10·9 %	Hb. 11 to 11·9 %	Hb. 12 to 12·9 %	Hb. below 13 %	Hb. 13g.% or over No.
16—20	51	7	—	10	10	17	44	56
21—25	29	5	—	10	10	20	45	55
26—30	87	6	4	8	34	30	82	18
31—35	83	—	5	5	20	26	56	44
36—40	88	10	14	6	36	30	96	4
41—45	82	5	5	25	25	15	75	25
46—50	84	—	—	30	25	25	80	20
51—55	86	10	10	30	20	25	95	5
56—60	45	20	45	—	—	—	70	30
Total ...	745							

TABLE 17—SHOWING DISTRIBUTION OF INDUSTRIAL WORKERS (MALE) IN DIFFERENT AGE GROUPS AND RED CELL COUNT IN MILL./C.MM.

Age group	No. of cases	R.B.C. in mill./c.mm. 0 to 2·9	3 to 3·4	3·5 to 3·9	4 to 4·4	Below 4·5	4·5 to 4·9
16—20 ...	51	17	—	33	—	50	50
21—25 ...	89	—	—	30	30	60	40
26—30 ...	87	5	—	35	40	80	20
31—35 ...	83	6	6	25	24	56	44
36—40 ...	88	5	30	30	20	85	15
41—45 ...	82	—	18	18	20	66	34
46—50 ...	84	20	40	—	20	80	20
51—55 ...	86	—	—	100	—	100	—
56—60 ...	65	33	—	33	—	66	34
Total ...	745						

TABLE 18—SHOWING DISTRIBUTION IN DIFFERENT AGE GROUPS AND RED CELL COUNT (IN MILL./C.MM.) IN THE CONTROL GROUP

Age group	No. of cases	R.B.C. in mill./c.mm. 0 to 2·9 (No.)	3 to 3·4 (No.)	3·5 to 3·9 (No.)	4 to 4·4 (No.)	Below 4·5 (%)	4·5 or over (No.)
16—25 ...	54	2	4	6	4	30	38
26—30 ...	42	1	3	5	8	40	25
31—35 ...	30	1	4	1	6	32	23
36—40 ...	36	—	3	2	5	28	26
41—45 ...	30	—	—	2	7	30	21
46—50 ...	27	—	—	—	6	20	21
51—55 ...	23	—	—	—	5	22	18
56—60 ...	19	—	—	—	6	30	13
Total ...	270						

As age advances the incidence of anaemia increases. This is due to associated long employment in the industry itself, and not due to age factor, because in the control group there is no rise in the incidence of anaemia as age advances.

(H) ANAEMIA IN INDUSTRIAL WORKERS IN RELATION TO LENGTH OF EMPLOYMENT:

Table 19 shows that the larger the number of years that a worker was in employment, the greater was the percentage of incidence of anaemia in them. This finding is the same as that of Mitra (1939) for industrial workers of Assam.

TABLE 19—SHOWING PERCENTAGE OF ANAEMIC CASES ACCORDING TO THE LENGTH OF EMPLOYMENT

Years of employment	% of anaemic cases
0— 0·9	2
1— 1·9	6
2— 2·9	12
3— 3·9	16
4— 4·9	24
5— 5·9	38
6— 6·9	44
7— 7·9	36
8— 8·9	50
9— 9·9	40
10—10·9	46
11 and above	60

(I) ANAEMIA IN INDUSTRIAL WORKERS WITH RELATION TO DAILY HOURS OF WORK IN INDUSTRIAL ENVIRONMENT (TABLE 20):

TABLE 20—SHOWING PERCENTAGE OF ANAEMIC CASES ACCORDING TO DAILY HOURS OF WORK

Daily hours of work	% of anaemic cases
4—4·9	30
5—5·9	26
6—6·9	32
7—7·9	38
8—8·9	50
9—9·9	56
10	64

(J) INDUSTRIAL POISON:

Workers exposed to industrial poison, etc., for a long time had a higher percentage of anaemics than otherwise.

(K) RELIGION:

Hindus and Mohammedans were equally affected and had nearly the same R.B.C., Hb. and P.C.V. values (Table 21).

(L) SOCIAL STATUS:

The per capita income was calculated and was found to be Rs. 40/- in the industrial group and Rs. 35/- in the control group. This analysis excluded the factor of income and dependants, which could play some important part.

(M) RESIDENCE:

Two colonies were examined according to random sampling. The first is an old colony and the second a recently built one. The results (Table 22) show that residence in two different colonies has not produced any material difference in the haematological picture found in the industrial workers and is quite different from the control group.

(B) CLINICAL ASPECTS

(A) DIET OF INDUSTRIAL WORKERS AND ITS RELATION TO ANAEMIA IN INDUSTRY:

After excluding other factors in the causation of anaemia the results of our survey of the industrial workers with regard to nutrition are discussed.

General observation—Analysis of the various constituents (according to Health Bulletin) of diet in workers and controls are given in Table 23.

TABLE 21—R.B.C., HB., P.C.V. AMONG DIFFERENT RELIGIONS

Religions	No. of cases	R.B.C. (in mill./c.mm.)		Hb. (in g./100 c.c.)		P.C.V.	
		Average	Range	Average	Range	Average	Range
Hindu	500	4·12	1·88—5·21	12	6—14·3	37	20—49
Mohammedan	200	4·11	1·89—5·0	11·9	6—14	36	21—47

TABLE 22—SHOWING AVERAGE R.B.C., HB. AND P.C.V. AMONST RESIDENTS OF TWO DIFFERENT COLONIES

Colonies	No. of cases	R.B.C. (in mill./c.mm.)		Hb. (in g./100 c.c.)		P.C.V.	
		Average	Range	Average	Range	Average	Range
Darshanpurwa	50	4·3	2·9—5·8	13	5·4—16	37	21—48
Ram-Bagh	50	4·2	3 —5·7	12·8	6·0—15	36	24—47

TABLE 23—SHOWING DIETARY FACTORS IN BOTH INDUSTRIAL WORKERS AND THE CONTROL GROUP (RURAL)

Items	Industrial workers (745 cases)			Control group (271 cases)		
	Range	Mean	S.D.	Range	Mean	S.D.
Calories	1120—4925	2501	507	1270—4520	2400	401
Iron (mg.)	15·2—49·0	29·99	5·2	14·9—49·8	27·89	4·4
Ca. (g.)	0·07—2·5	2·284	0·08	0·098—2·42	1·28	0·07
Vit. A (I.U.)	1112—3000	2400	160	910—4500	1900	150
Protein (g.)	24·4—187	70	10·8	24·6—170	65	9·2
Carbohydrate (g.)	130—720	494	50·5	125—801	501	40
Fats (g.)	5—25	13	3·0	4—23	14	1·2

Calories—Consumption of oil was universal. Average surface area was 1·78 meters in both groups. In calculation 10 per cent was deducted to account for the losses from theoretical value, during cooking, etc. There is general agreement that in industrial workers there is shortage of calories but from Table 23 we can judge that 2501 is quite a liberal amount as compared with 2400 of the control (rural) group.

Iron—In both groups in this series, the iron intake was more than 25 mg. When discussing the value of iron content in industrial workers of Kanpur, we are fully aware of the limitation which such a calculation from the daily diet has. An ordinary diet will supply ample iron for a normal man, if the iron content of the diet exceeds 5 mg.

Proteins—Their value in synthesis of haemoglobin is well established. A careful analysis in this series showed that actually protein intake was slightly more than in the control group.

(B) SIGN OF NUTRITIONAL DEFICIENCY AND ANAEMIA :

Nearly 74 per cent of workers in this series were classed as having good or fair general appearance as compared with 70 per cent of control group. But irrespective of the state of general appearance, about 15 per cent showed manifestation of malnutrition which is slightly less than in control group (Table 24).

TABLE 24—SHOWING PERCENTAGE INCIDENCE OF MALNUTRITION IN WORKERS

Nature of malnutrition	Per cent of workers in each group according to general appearance					
	Good		Fair		Poor	
	Workers	Control	Workers	Control	Workers	Control
Xerosis conjunctiva	38	40	39	42	37	40
Pigmentation ...	12	13·5	20	22	18	20
Folliculosis ...	18	19	11·5	12	14	15·7
Dry & rough skin ...	2	4	3·8	4	6	6·2
Gingivitis ...	14·2	16	11	13	13	13·5

(C) PATHOLOGICAL ASPECTS

(A) STOOL EXAMINATIONS :

Of the total, five could not get their stool examined. 796 subjects (males and non-pregnant and pregnant females) with 268 controls are analysed in Table 25.

TABLE 25—SHOWING PERCENTAGE DISTRIBUTION OF WORMS IN STOOLS OF INDUSTRIAL WORKERS AND THE CONTROL GROUP

Worm infestation in stools	Workers			Control		
	Males	Non-pregnant females	Pregnant females	Males	Non-pregnant females	Pregnant females
No. of cases ...	740	30	26	212	30	26
Hookworm ...	35	45	42	30	50	42
Roundworm ...	20	4	8	15	4	5
Tapeworm ...	5	0	4	5	0	5
Cyst ...	14	10	8	15	12	4
Combined (HW, RW)	2	3	4	3	4	10
,, (HW, TW)	0	0	4	4	2	4

In this series the hookworm infestation was slightly more common than in the control group. This slight difference fails to explain the 30 per cent increase of anaemia in industrial workers. It is suggested that industry itself may be responsible in these cases for the anaemia. There is a high incidence of nearly 90 per cent of people walking bare-footed into the fields or common public latrines of which 40 per cent exists in a deplorable condition. This can explain the high incidence in general.

(B) FRACTIONAL TEST MEAL :

This was done in selected cases of anaemia in industrial and control group (Table 26). It will be seen that there is a slightly high incidence of hyperchlorhydria in industrial workers.

TABLE 26—SHOWING RESULTS OF FRACTIONAL TEST MEAL

Population	No. of cases	Normal	Hyper-chlorhydria	Hypo-chlorhydria
Industrial ...	50	25	20	5
Rural ...	25	10	7	8

(C) URINE EXAMINATION :

Category of workers—Workers handling lead in the factory or persons exposed to lead in any form whether as fumes, dusts or mists were included in the survey. For convenience, the subjects were divided into three groups.

Group A—Workers exposed to large amounts of lead or lead compound dusts and fumes such as workers in casting, mixing and pasting, group burning, link burning, plate store and assembly departments.

Group B—Less exposed workers in the formation department, separation thereafter, battery charger, compound pourer, etc.

Group C—Workers exposed to small amounts of these salts in certain departments in the textile industry.

Collection of urine—After the workers had been warned about washing hands and avoiding any contact with the skin or clothing with the mouth of the bottle, urine was collected directly into a chemically clean specimen bottle, and examined immediately.

A routine examination of urine was followed by exclusion of cases which had albumin, etc. Urobilinogen and carproporphyrin III were estimated by Ehrlich's test and by means of ultraviolet lamp in 56 persons exposed to lead and other heavy metals. This was done to determine the incidence of lead poisoning, and the absorption of lead and to find out in how many of the workers lead and other heavy metals were responsible for the causation of anaemia. The examination was preceded by a detailed clinical history with special reference to examination of eyes, respiratory system, alimentary system for abdominal pain, constipation, blood pressure, tremors, and joints for arthralgia. Diseases like filariasis, kala-azar and malaria, which can give positive carproporphyrin test, were excluded.

The colour obtained in Woods lamp was arbitrarily divided into the following classes:

0=Light blue to light green=normal porphyrin concentration.
+ =Slight red fluorescence=slight increase in porphyrin.
+ + =Distinct red fluorescence=moderate increase in porphyrin.
+ + + =Strong red fluorescence=marked increase in porphyrin.
+ + + + =Deep red fluorescence=vary marked increase in porphyrin.

TABLE 27—SHOWING NUMBER OF INDIVIDUALS IN EACH CLASS ACCORDING TO PORPHYRIN CONCENTRATION

Class	No. of individuals	Per cent	Positive per cent above
0	22	39	
+	19	32	
++	8	15	
+++	5	9	
++++	2	4	27

Table 27 reveals that only 4 per cent of workers exposed to heavy metals, chiefly lead, in all types of industries, has marked porphyrinuria. These workers came from battery works. Wintrobe (1956) argued that if anaemia had to be attributed to lead poisoning there must be marked anaemia in porphyrinuria. We can, therefore, conclude that an incidence of 4 per cent may be due to lead only in battery works.

For convenience, only three categories are further mentioned (Table 28). All cases above + + were classified positive, above + as doubtful and 0 as negative.

TABLE 28—SHOWING 3 CATEGORIES OF WORKERS IN THE 3 GROUPS

Groups	Caproporphyrin III in urine			Total No. of workers
	Positive	Doubtful	Negative	
A ...	4	6	8	18
B	6	6	6	18
C ...	5	7	8	20
Total	15	19	22	56
Controls	0	3	22	25

In textile industry (C), workers are exposed to lead in the printing department. Exposure is no doubt less than that in the battery department, but marked porphyrinuria was only found in battery workers. In this series, the incidence of porphyrinuria is high. This shows that incidence of lead absorption is great, though lead as cause of anaemia is not so important a factor.

Length of employment and porphyrinuria.—Workers who have been exposed for a longer time have greater excretions of caproporphyrin III in the urine (Table 29).

TABLE 29—SHOWING LENGTH OF EXPOSURE IN DIFFERENT CASES

Length of exposure	Caproporphyrin III in urine			Total No. of workers
	Positive	Doubtful	Negative	
1 to 4 years	1	9	6	16
5 to 9 years	4	4	6	14
10 to 14 years	5	2	6	13
15 or over ...	5	4	4	13
Total ...	15	19	22	56

Tremors, colic, arthralgia and porphyrinuria—Fine tremors were detected in 6 per cent of workers exposed to the hazard of lead, and caproporphyrin III was strongly positive in a few of these cases. Similarly there was a history of abdominal colic in 4 per cent of cases and all had capropor-

phyrin III in marked amounts. In these cases arthralgia was noted in 6 per cent cases.

In discussing the caproporphyrin excretions we have to keep in mind the associated idiopathic type of porphyrias. Since positive cases were nearly equal in number in textile workers who were the least exposed to hazards of lead, and none of them had marked (+ + + +) excretions, proving that lead may not be the only factor concerned. Arsenic is a cause of increased caproporphyrin III excretions, which may play a part in porphyrinuria in textile industrial workers, specially of the dyes department.

Lead poisoning in this country is extremely rare as compared with those in foreign countries. This can be explained by the comparatively high carbohydrate diet of Indians or the standards of the foreign workers may be different than those of Indian workers. Regarding caproprophyrin excretion in urine, Lane (1954) remarked that these levels gave an early indication of the effect on blood and blood-forming organs and it occurred early, before other signs of lead poisoning had manifested.

(D) BASOPHIL STIPPLINGS :

In laboratory examination of blood, basophil stippling was determined by supravital stains and examination with $\frac{1}{12}$" lens and No. 10 eyepiece. Finding of one stippled cell/15 field was considered as normal (Lane, 1931, quoted by Whitby and Britton, 1953).

10 out of 56 cases were positive mainly in workers of A and B categories (Table 30).

TABLE 30—SHOWING NUMBER OF WORKERS IN DIFFERENT GROUPS

Groups	Positive basophil stippling	Normal	Total No. of workers
A	5	15	20
B	4	14	18
C	1	17	18
Total	10	46	56

Only 1 case in textile workers (C) was positive and hence the finding of the caproporphyrin III in this category is not of much significance. Basophil stippling was clearly positive in all cases having marked (+ + + +) excretions.

Only 4 per cent of the cases had both these findings positive and we can safely state that the anaemia may be due to lead poisoning. Gupta and Iyer (1956) have shown in their series that 31 per cent were not affected, 23 per cent were in the borderline and 13 per cent in the stage of lead exposure, which were higher than in our series.

(E) THERAPEUTIC RESPONSE OF ANAEMIA IN GENERAL :

Anaemia in this series responded poorly to haematinics, such as iron (Table 31), suggesting that anaemia was not due to any deficiency but due to some inhibitory factor in the industrial environment itself.

TABLE 31—SHOWING RESPONSE TO IRON IN WORKERS IN THE 3 GROUPS

Category	No. of cases	Response to iron		
		Good	Fair	Poor
Industrial	... 50 (anaemic)	2	18	30
Control	... 25 (anaemic)	18	5	2

DISCUSSION

In grouping males, non-pregnant and pregnant females we have found the following data for the rural population: R.B.C. 5·12 mill./c.mm., Hb. 14·5 g./100 c.c., and P.C.V. 44·5 per cent (298 cases).

29 per cent of the rural population, kept as controls, was also found to be anaemic. 58 per cent of the industrial population (801 cases) examined was found to be anaemic. In nearly 29 per cent of (anaemic) industrial population, no cause of anaemia could be found. This may be due solely to the adverse effects of industrial atmosphere.

In 4 per cent of workers exposed to the hazards of heavy metals (chiefly lead), the anaemia could be attributed to lead poisoning, because of the finding of marked porphyrinuria (+ + + +) with punctate basophilia also positive in these cases. 27 per cent of those who had + + caproporphyrinuria were thought to be cases of lead absorption which, of course, cannot cause anaemia.

Other factors which cause anaemia in rural as well as industrial population in almost equal proportions, were cases of worm infestation (Fig. 1 and Table 25) and dietary deficiency, etc.

Incidence of anaemia was maximum in metal workers and then in textiles, chemicals and oil and tannery mills in order of frequency (Fig. 2 and Table 9).

Severe (+ + +) grade of anaemia was present in 4 times greater proportion in industrial population than in the control (rural) group, while mild (+) grade of anaemia was common in the control than in the industrial group (Fig. 3 and Table 12).

Anaemia found in industrial workers was mostly normocytic normochromic as compared with microcytic hypochromic of the control group.

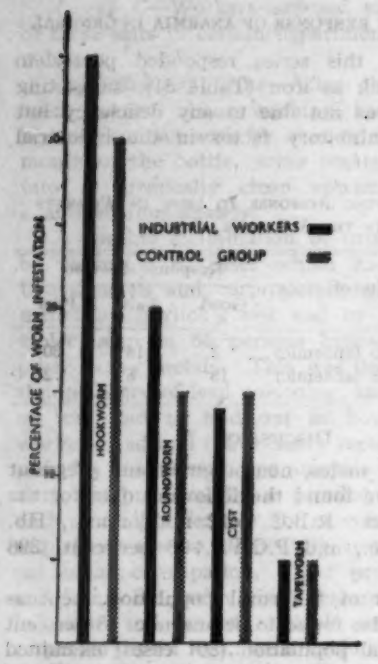


FIG. 1—SHOWING RESULTS OF STOOL EXAMINATION IN MALE INDUSTRIAL WORKERS AND CONTROL GROUP

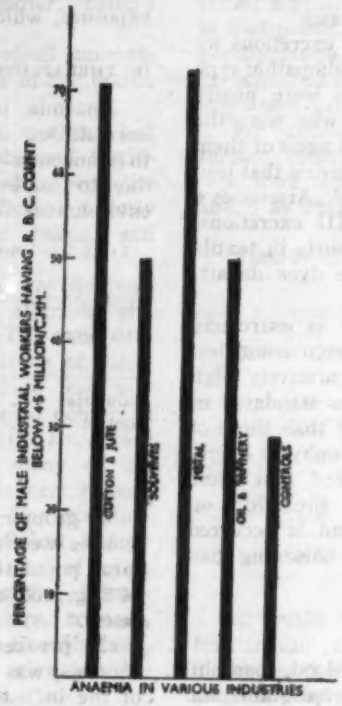


FIG. 2—SHOWING INCIDENCE OF ANAEMIA IN VARIOUS INDUSTRIAL WORKERS

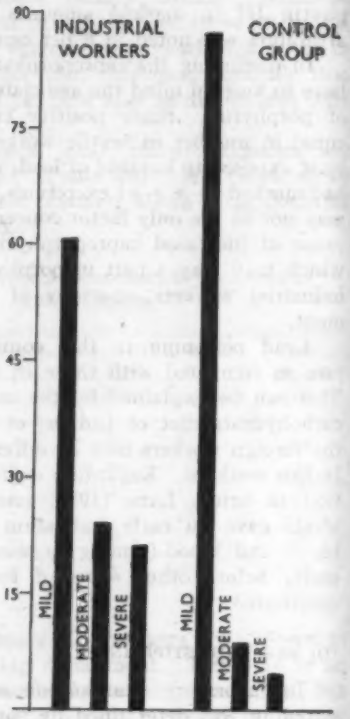


FIG. 3—SHOWING PERCENTAGE OF ANAEMIA IN MALE INDUSTRIAL WORKERS AND CONTROL GROUP

Certain departments of the textile industry had a higher number of anaemic persons (excluding all other factors, except industry itself), e.g., in weaving, carding, spinning and blow rooms departments. The environment in these departments was highly uncomfortable than that in other departments. The bad industrial environment might be depressing to the general metabolism of the workers and haemopoietic system, being no exception, also suffers.

Higher percentage of anaemics in certain departments of textile industry, where the workers are exposed to lead salts and aniline derivatives, can be explained by direct action of these poisons.

In anaemia due to industrial environment the incidence was directly proportional to the length of employment and the daily hours of work in the industry. It was also related to the age of the worker which, of course, was not due to advance in age or increase in the number of departments, or increase in worries, but was due to associated increase in the length of employment (Fig. 4 and Table 19 and Fig. 5 and Table 20).

Response to haematinics was poor, suggesting some inhibitory factor limiting the red cell and haemoglobin levels.

This anaemia is normocytic hypochromic in type, common in certain departments of industry where working conditions are extremely uncomfortable, and the incidence of anaemia is directly proportional to the length of employment and the hours of work, which cannot be explained by age, sex or economic status, either by worm infestation or deficient diet and above all fails to respond well to haematinics.

The anaemia is probably due to depression of all functions of the body, including the haemopoietic system, and is due to long hours of work in an uncomfortable atmosphere and in a few cases due to exposure to known poisons and lead.

ACKNOWLEDGMENTS

My profound gratitude to Professor B. B. Bhatia, Head of the Department of Medicine, Lucknow University, for his constant guidance. Thanks are also due to Dr. H. N. Shivapuri, President, Indian Medical Association, under whose supervision this work was done when he was Deputy Director, Employees State Insurance Scheme at Kanpur. He constantly encouraged the author and gave

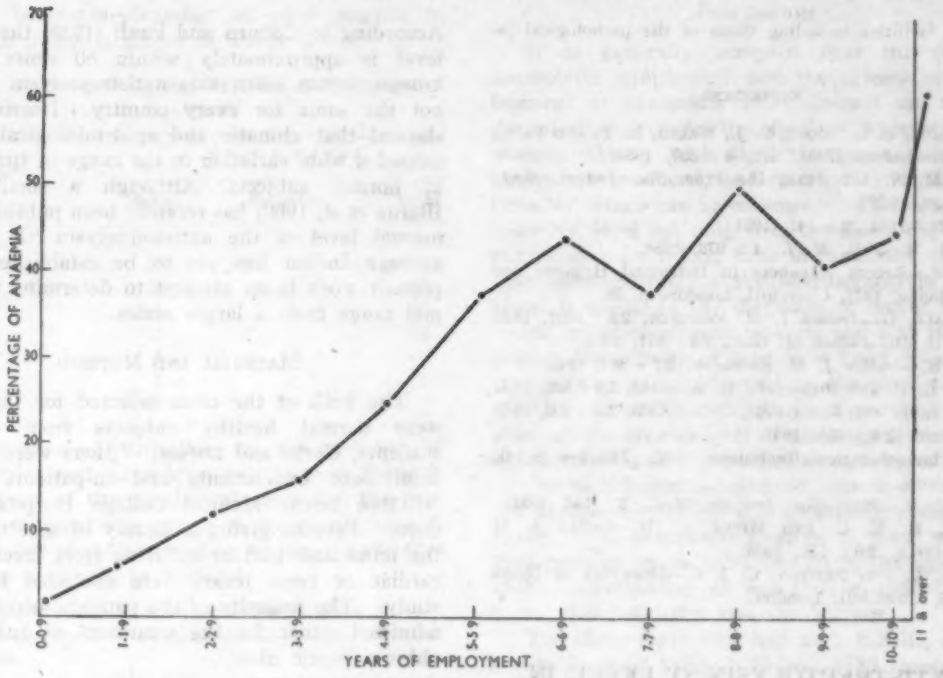


FIG. 4—SHOWING PERCENTAGE OF ANAEMIC CASES ACCORDING TO LENGTH OF EMPLOYMENT

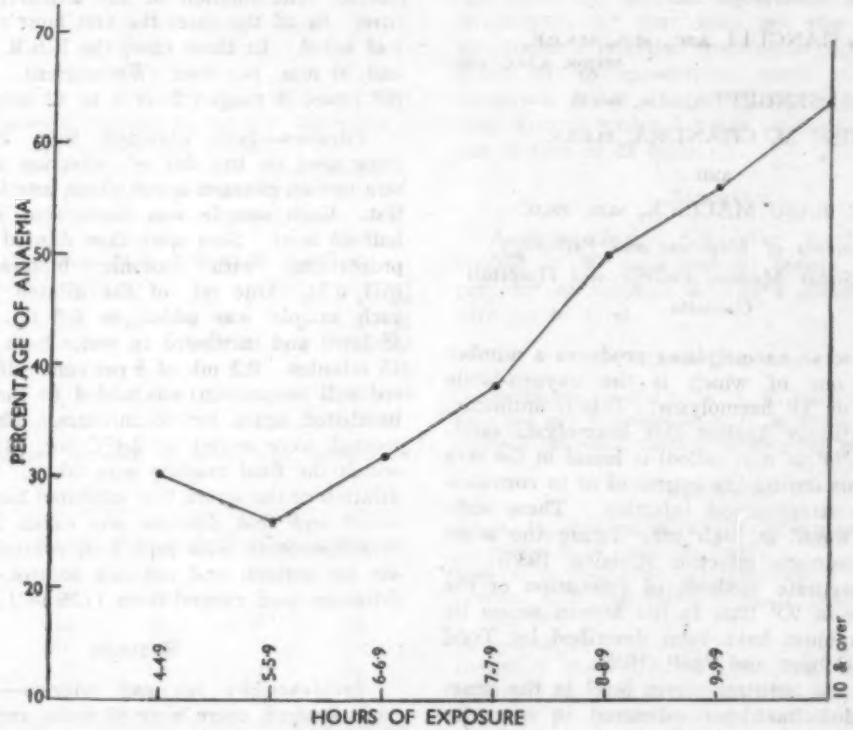


FIG. 5—SHOWING PERCENTAGE OF ANAEMIC CASES ACCORDING TO HOURS OF EXPOSURE

him all facilities including those of the pathological laboratory.

REFERENCES

De Mellow, B. R., Modi, O. J., Walsh, M. P. and Patel, J. C.—*Indian J. M. Sc.*, **4** : 337, 1950.

Gupta, M. N. and Iyer, H.—*Proc. Soc. Indust. Med.*, **8** : 20, 1956.

Khan, N.—*Ibid*, **3** : 141, 1951.

Lane, R. E.—*Brit. M. J.*, **1** : 978, 1954.

Lind, W.—Recent Advances in Industrial Hygiene and Medicine, 1937, Churchill, London, p. 30.

Macdonald, G.—*Indian J. M. Research*, **26** : 1001, 1939.

Mitra, D. D.—*Indian M. Gaz.*, **74** : 671, 1939.

Mitra, K.—*Indian J. M. Research*, **27** : 887, 1940.

Napier, L. E. and Bilimoria, H. S.—*Ibid*, **25** : 529, 1937.

Napier, L. E. and Das Gupta, C. R.—*Ibid*, **23** : 305, 1935.

Idem—*Ibid*, **24** : 855, 1937.

Idem—Haematological Technique, 1945, Thacker Spink, Calcutta.

Row, V. K.—*Proc. Soc. Industr. Med.*, **3** : 1146, 1951.

Wilson, H. E. C. and Mitra, D. D.—*Indian J. M. Research*, **26** : 131, 1938.

Whitby, L. and Britton, C. J. C.—Disorders of Blood, 1953, Churchill, London.

ANTISTREPTOLYSIN 'O' LEVEL IN INDIANS

L. K. GANGULI, B.SC., M.D., M.R.C.P., MAJOR A.M.C./RES.

A. SENGUPTA, M.B., D.T.M.

(MISS) M. CHANDRA, M.B.B.S.

AND

K. C. BASU MALLICK, M.D., PH.D.

Departments of Medicine and Pathology
Nilratan Sircar Medical College and Hospitals
Calcutta

Streptococcus haemolyticus produces a number of toxins, one of which is the oxygen-labile haemolysin or 'O' haemolysin. This is antigenic, and the antibody against this haemolysin (anti-haemolysin 'O' as it is called) is found in the sera of individuals during the course of or in convalescence from streptococcal infection. These antibodies are found in high titre during the acute phase of rheumatic infection (Coburn, 1936).

Fairly accurate methods of estimation of the antistreptolysin 'O' titre in the human serum by simple techniques have been described by Todd (1932) and Coburn and Pauli (1935).

The normal antistreptolysin level in the general population has been estimated in countries where rheumatic heart disease is a major problem. According to Coburn and Pauli (1939) the normal level is approximately within 50 units in the human serum. But this antistreptolysin level is not the same for every country. Harris (1948) showed that climatic and epidemiological factors caused a wide variation in the range of titre found in normal subjects. Although a small series (Barua *et al*, 1960) has recently been published, the normal level of the antistreptolysin 'O' for the average Indian has yet to be established. The present work is an attempt to determine the normal range from a larger series.

Material and Method

The bulk of the cases selected for this study were normal healthy subjects from amongst students, clerks and nurses. Others were selected from both out-patients and in-patients of the Nilratan Sircar Medical College Hospitals, Calcutta. Persons giving a history of sore throat in the immediate past or suffering from fever or any cardiac or renal lesion were excluded from the study. The majority of the patients selected were admitted either for the treatment of anaemia or chronic peptic ulcer.

The E.S.R. was examined in each case previous to determination of the antistreptolysin 'O' titre. In all the cases the first hour reading only was noted. In three cases the E.S.R. was 20, 22 and 30 mm. per hour (Westergren). In the rest (97 cases) it ranged from 6 to 12 mm. per hour.

Titration—Sera obtained from the patients were used on the day of collection as in stored sera certain changes occur which interfere with the test. Each sample was inactivated at 56°C for half an hour. Sera were then diluted in different proportions with isotonic buffered solution (pH 6·5). One ml. of the diluted serum from each sample was added to 0·5 ml. of antigen (Sclavo) and incubated in water bath at 37°C for 15 minutes. 0·5 ml. of 5 per cent rabbit's washed red cell suspension was added to each tube and incubated again for 45 minutes. The sera thus treated were stored at 2-4°C for 18 hours after which the final reading was taken. The highest dilution of the serum that inhibited haemolysis was noted and that dilution was taken as the titre. Simultaneously with each test, control tubes were set for antigen and red cell control. The serial dilutions used ranged from 1/25 to 1/250.

Results

Incidence by sex and religion—Out of 100 cases studied, there were 80 males and 20 females. Of these 9 were Muslims, 90 Hindus and 1 other.

Age incidence—Number of cases studied in each age group is shown in Table 1.

TABLE 1—SHOWING NUMBER OF CASES IN DIFFERENT AGE GROUPS

Age groups (years)	No. of cases		
	Males	Females	Total
6—10 ...	4	nil	4
11—15 ...	14	5	19
16—20 ...	25	5	30
21—25 ...	14	8	22
26—30 ...	12	1	13
31—35 ...	3	nil	3
36—40 ...	5	1	6
Above 40 ...	3	nil	3

Titre level—Distribution of the number of cases under each titre level is shown in Table 2. An analysis of the number of cases and the titre level in different age groups is shown in Table 3. The number of cases according to sex and the titre level are presented in Table 4.

TABLE 2—SHOWING NUMBER OF CASES IN EACH TITRE

Titre levels	No. of cases
1/25	16
1/50	53
1/100	19
1/125	8
1/250	4

TABLE 3—SHOWING NUMBER OF CASES IN DIFFERENT AGE GROUPS AND TITRES

Titre levels	Age groups in years								Total
	6-10	11-15	16-20	21-25	26-30	31-35	36-40	Above 40	
1/25	1	1	1	5	4	1	2	1	16
1/50	1	12	10	10	7	1	2	1	53
1/100	1	4	5	6	1	0	1	1	19
1/125	0	1	4	1	0	1	1	0	8
1/250	1	1	1	0	1	0	0	0	4

TABLE 4—SHOWING NUMBER OF MALES AND FEMALES IN EACH TITRE

Titre levels	Males	Percentage	Females	Percentage
1/25 ...	15	19	1	5
1/50 ...	42	51	11	55
1/100 ...	12	15	7	35
1/125 ...	7	9	1	5
1/250 ...	4	5	nil	—

DISCUSSION

It is generally accepted that infection by haemolytic streptococci and the subsequent development of rheumatic heart disease are related. An infection precedes the attack of rheumatic heart disease. Along with the infection specific antibodies are produced, one of which is antistreptolysin 'O' which can be measured. The antistreptolysin 'O' level not only rises far above the normal but persists for a long time in rheumatic subjects. The determination of the antistreptolysin 'O' in blood is useful in the diagnosis of recent streptococcal infection of specific type and also in determining the activity of rheumatic heart disease. It is an important supplement to clinical data.

The evaluation depends on a previous knowledge of the normal level of antistreptolysin 'O' in the population of that particular country or region.

Out of 100 cases studied, 69 showed a maximum rise of titre up to 1/50 and 19 showed a rise up to 1/100. The maximum number of cases showing titre positive up to 1/50 was 20 in the age group 16-20. Considering all age groups and all serial titres, this incidence was the highest.

The three cases who had high E.S.R., showed a titre level of 1/50, 1/25 and 1/50 respectively.

The estimation of antistreptolysin 'O' titre in the age group 0-5 was not undertaken because antistreptolysin 'O' titre does not rise following a streptococcal infection in children below 3. In a study of 46 consecutive cases of established rheumatic heart disease, McCarty (1952) found only 2 cases under 5 years showing a maximum rise of titre of 25 units.

SUMMARY

Antistreptolysin 'O' titre level has been studied in 80 male and 20 female Indians. 69 per cent of subjects showed a maximum rise of titre up to 1/50.

ACKNOWLEDGMENTS

Our thanks are due to Dr. A. K. Dutta Gupta, former Principal and Superintendent, N. R. Sircar Medical College and Hospitals, Calcutta for help and encouragement.

REFERENCES

BARUA, D., BISWAS, S. K. AND MUKHERJEE, A. B.—*J. Indian M. A.*, **34** : 301, 1960.
COBURN, A. F.—*Lancet*, **2** : 1025, 1936.
COBURN, A. F. AND PAULI, R. H.—*J. Clin. Invest.*, **14** : 651, 1935.
Idem—Ibid, **18** : 141, 1939.
HARRIS, T. N.—*Am. J. Dis. Child.*, **76** : 411, 1948.
MCCARTY, M.—*Ann. Int. Med.*, **37** : 1021, 1952.
TODD, E. W.—*J. Exper. Med.*, **55** : 267, 1932.

ABNORMAL FISSURES AND LOBES OF THE LUNGS

Preliminary Observations on Some Cases

J. S. MAKHANI, M.B.B.S., M.S.

AND

G. A. KHER, M.B., M.S.

Department of Anatomy, M. G. M. Medical College Indore

Reports on the incidence of the fissures and the accessory fissures of the lungs are scattered in the literature. In view of the present-day importance and increasing use of thoracic surgery, the authors thought it advisable to undertake the present work.

Materials and Methods

The present work was carried out on adult cadaveric and foetal lungs which were obtained from the department of anatomy, M.G.M. Medical College, Indore, and from the maternity wards of M. Y. Hospital, Indore respectively. In all, 54 adult lungs and 36 foetal lungs were studied.

Review of Literature

FISSURES :

Right lung—(i) Primary interlobar fissure or oblique fissure ordinarily begins somewhat lower than the corresponding fissure on the left side. It begins deep to the 5th rib with occasional variations on either side. The fissure tends to follow downwards and forwards the line of the 6th rib, at least as far as the mid-axillary line and ends close to the costochondral junction of the 6th rib.

(ii) Horizontal fissure or secondary fissure starts in the mid-axillary line and runs almost horizontally or slightly upwards to end at about the costochondral junction of the 4th rib.

These fissures may be present in their complete extent in relation to their length and depth or may be only partially present or even absent as is evident from Table 1.

Table 1

Serial No.	Worker	Complete %	Partial %	Absent %
1	Deve (1900)	47·8	50·0	2·0
2	Kent & Blades (1942)	12·0	67·0	21·0
3	Brock (1946)	37·0	53·0	10·0
4	Hovalacque (1937)	29·0	51·0	20·0

Left lung—The oblique fissure of the left lung is said to be somewhat more variable than that of the right lung. It begins deep to the 5th rib, but frequently extends even as high as the 3rd rib. It runs slightly more vertically than the oblique fissure of the right side, usually crossing either the 5th or the 6th rib at about the mid-axillary line. It runs forward thereafter at the level of the 6th interspace to end typically deep to the distal end of the 7th costochondral junction or in the adjacent portion of the 6th space. Percentages of occurrence of this fissure is not abundant in the literature.

ACCESSORY FISSURES :

An appreciable fissure may sometimes be found subdividing one of the otherwise normal lobes of the lung. Studying the foetal lungs Deve found such fissures to be far more frequent on the right side. The accessory fissures may represent themselves as normal fissures in the true sense, or as notches with incomplete fissures extending for a limited distance on the surface of the lungs. Even subpleural fissures or furrows which while not actually being fissures, are in the same position and have the same importance, for the accessory fissures or furrow often delimit the areas of distribution of segmental bronchus. The accessory fissures may separate two different segments, e.g., fissure separating the medial basal from the rest of the lower lobe, segment separating the dorsal (apical) segment of the lower lobe from the rest of the lower lobe. Usually the accessory fissure of the lung tends to correspond to the plane of division between the bronchopulmonary segments of the lobe without exception.

All the actual fissures are true to their definition but besides these there are fissures which may be called pseudofissures and are due to displaced structures, e.g., the one due to the azygos vein. Another good example of accessory lobe is the infracardiac lobe. In fact, it is the privilege of the quadruped animals to be in possession of this lobe. This lobe has been given different names by different workers as is clear from Table 2.

Table 2

Serial No.	Name	Suggested by
1 ...	Retrocardiac	Ewart (1889)
2 ...	Cardiac	Krammer and Glass (1938)
3 ...	Medial basal	Brock (1946)
4 ...	B^1	Boyden (1955)
5 ...	Azygos	Keith (1948)

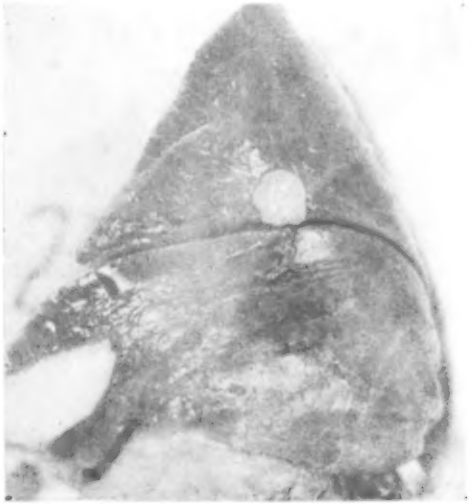


Fig. 1—Showing absence of transverse fissure in the right foetal lung.

Fig. 2—Showing the fissure separating the apical segment of the lower lobe of right foetal lung.

Fig. 3—Showing the infracardiac lobe of the right lung.

Fig. 4—Skiagram of the chest showing a threadlike shadow (A) of mesoazygos and a pear-shaped shadow (B) of azygos vein.

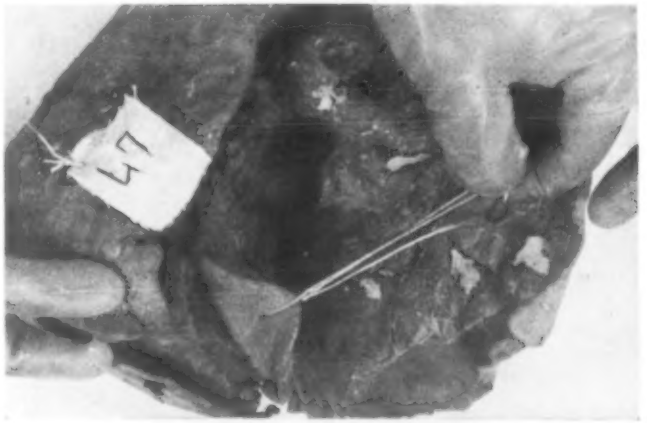


Fig. 5—Showing the infracardiac lobe of the right lung.

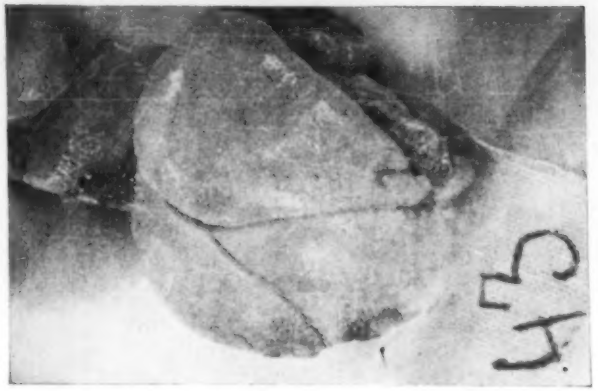


Fig. 6 Showing the right foetal lung with three normal lobes.

Fig. 7—Showing foetal lung with one lobe only.

Fig. 8—The right foetal lung showing only two lobes.

Fig. 9—The right foetal lung showing three partial lobes.

Fig. 10—The left foetal lung showing two lobes only.

ENGRAVED & PRINTED BY REPRODUCTION SYNDICATE, CALCUTTA 6

Observations

The present study revealed the following interesting variations as compared to those reported by foreign workers.

FISSURES :

Right lung—The fissures of the right lung are :

1. *Oblique fissure or the primary interlobar fissure* was recorded in 54 adult lungs and 36 foetal lungs. In the adult series it was completely present in full extent in 52 cases (96·3 per cent) and absent in 2 cases (3·7 per cent). In the foetal series it was present in 35 cases (97·3 per cent) and absent in 1 case (2·7 per cent).

2. *Horizontal fissure* in the adult series was completely present in 22·4 per cent and partially present in 72·2 per cent and absent in 5·6 per cent. In the foetal series it was completely present in 19·4 per cent, partially present in 50·0 per cent and absent in 30·6 per cent (Figs. 1 and 2, *vide* Plate).

The results of the two series differ, the incidence of the transverse fissure in the foetal lungs being higher as compared to the adult lungs. This can only be explained by the postnatal development of the fissure along with the development of the lungs as such.

Left lung—In the adult series it was present in 52 cases (96·3 per cent) and absent in 2 cases (3·7 per cent). In the foetal series it was present in 32 cases (89 per cent) and absent in 11·0 per cent.

ACCESSORY FISSURES :

Right lung—These fissures occur less commonly in the adult than in the foetal series, and in the latter they are more common on the right side.

The incidence of occurrence of the fissure separating the superior (dorsal, apical) segment of the right lower lobe from the rest of the lower lobe, is 5·5 per cent in the foetal series. No such case was recorded in the adult series.

The azygos lobe was seen in 1·8 per cent of cases. The plain skiagram of the chest of this patient was taken before death. This also showed the linear shadow of the mesoazygos, with a pear-shaped shadow at its lower end, which represented the azygos vein (Fig. 4, *vide* Plate).

Infracardiac lobe was seen in the foetal series in 3 cases only (8·3 per cent) and in 4 cases from the adult series (7·4 per cent) (Figs. 3 and 5, *vide* Plate). Their incidence is comparatively greater in the foetal series.

Left lung—No accessory fissure was found on the left side, throughout the adult or the foetal series.

LOBES :

Right lung—In the foetal series of 36 cases, only in 6 cases (16·6 per cent) the right lung presented 3 complete lobes (Fig. 6, *vide* Plate) ; in 18 cases (50 per cent) three partial lobes and in 6 cases (16·6 per cent) 2 lobes were present while in one case (2·7 per cent) only one lobe was seen.

In the adult series three complete lobes were seen in 70·5 per cent, two lobes in 7·4 per cent (Fig. 8, *vide* Plate), one lobe in 1·8 per cent and three partial lobes in 20 per cent (Fig. 9, *vide* Plate).

Left lung—In the foetal series 4 cases (11·4 per cent) presented one lobe only (Fig. 7, *vide* Plate), one case (2·7 per cent) had 3 lobes only and 31 cases (86·2 per cent) had 2 lobes (Fig. 10, *vide* Plate). Among the adult series all the 54 cases presented 2 lobes.

Results

FISSURES :

Right Lung :

(*a*) Transverse fissure :

(*i*) Adult series—Completely present in 22·2 per cent ; Partially present in 72·3 per cent ; Absent in 5·6 per cent.

(*ii*) Foetal series—Completely present in 19·4 per cent ; Partially present in 50·0 per cent ; Absent in 30·5 per cent.

(*b*) Oblique fissure :

(*i*) Adult series—Absent in 3·7 per cent ;

(*ii*) Foetal series—Absent in 2·7 per cent.

Left Lung :

(*i*) Adult series : (*a*) Fissures completely present in 96·3 per cent ; (*b*) Fissure absent in 3·7 per cent.

(*ii*) Foetal series : (*a*) Fissure completely present in 89·0 per cent ; (*b*) Fissure absent in 11·0 per cent.

ACCESSORY FISSURES :

Right Lung :

1. Fissure separating the medial basal segment from the rest of the lower lobe.

(*i*) Adult series—7·4 per cent ;

(*ii*) Foetal series—8·7 per cent.

2. Fissure separating the right apical basal segment from the other lower lobe segments.

(*i*) Adult series—No such case was recorded ;

(*ii*) Foetal series—5·5 per cent.

ENGRAVED & PRINTED BY REPRODUCTION SYNDICATE, CALCUTTA 6

3. Fissure separating the azygos lobe from the right upper lobe.

(*i*) Adult series—1·8 per cent ;

(*ii*) Foetal series—No case recorded.

LOBES :

Right Lung :

(*i*) Adult series—Three complete lobes in 70·5 per cent ; Two lobes in 7·4 per cent ; One lobe in 1·8 per cent ; Three partial lobes in 20·3 per cent.

(*ii*) Foetal series—Three lobes complete in 16·6 per cent ; Three partial lobes in 50·0 per cent ; Two lobes in 16·6 per cent ; Four lobes in 14·0 per cent ; One lobe only in 2·7 per cent.

Left Lung :

(*i*) Adult series—Two lobes in 100 per cent.

(*ii*) Foetal series—One lobe only in 11·1 per cent ; Two lobes in 86·2 per cent ; Three lobes in 2·7 per cent.

Summary

A comprehensive study of the various fissures and patterns of lobation of the lungs has been done on 90 specimens (54 adult and 36 foetal). Their incidence has been recorded and compared with the findings of other workers.

Acknowledgment

Our sincere thanks are due to Dr. B. C. Bose, Principal, M. G. M. Medical College, Indore, for his kind permission to publish this work.

References

Boyden, E. A.—Segmental Anatomy of Lungs, Blackiston, 1955, New York.

Brock, R. C.—The Anatomy of the Bronchial Tree with Special Reference to the Surgery of the Lung Abscess, 1946, Oxford University Press, New York.

Deve, M. F.—*Bull. et mem. Soc. ant. Paris*, **75** : 341, 1900.

Ewart, W.—The Bronchial and Pulmonary Blood Vessels : Their Anatomy and Nomenclature with Criticism of Professor Aeby's view on the Bronchial Tree of Mammalia and of Man, 1889, Baillière, Tindall & Cox, London.

Hovalacque, M. O.—Le Thorax, Anatomie Medico Chirurgicale, 1937, Paris.

Kent, E. M. and Blades, B.—*J. Thoracic Surg.*, **12** : 18, 1942.

Keith, A.—Human Embryology and Morphology, 6th Edition, 1948, Arnold, London, p. 488.

Krammer, K. and Glass, A.—*Ann. Otol. Rhin. & Laryng.*, **41** : 1210, 1932.

PRACTITIONERS' SERIES

ANAEMIAS : THEIR MANAGEMENT

J. B. CHATTERJEA, M.D., F.N.I.

Professor of Haematology

School of Tropical Medicine, Calcutta

Anaemia is not a disease entity. It is only a symptom, comparable in a sense to symptoms like headache, fever and diarrhoea. As an important symptom, anaemia may accompany a wide variety of clinical conditions. The essential pre-requisite for its rational management is a precise diagnosis of the nature and cause of anaemia. Pitfalls in the diagnosis can only be avoided by a systematic clinical review of the patient, followed and supplemented by appropriate laboratory examinations. The not uncommon practice of clinical and laboratory examinations being taken care of by two different persons, often, in two different places, independent of each other, cannot but interfere with the integration and interpretation of relevant data so essential for correct diagnosis. The common practice of prescribing haematinics without ascertaining the pathogenetic mechanism that has led to the development of anaemia cannot be too strongly condemned. It should be remembered that such a practice is not only ineffective but may at times be dangerous. Empirical iron therapy in hypochromic anaemias due to gastrointestinal lesions would only give a false impression of cure and thus delay early diagnosis which is so essential for the eradication and/or control of the primary disease.

Under physiological conditions, normal red cell and haemoglobin levels are maintained by a balance between their production in the bone marrow and destruction by the normal lytic systems of the body. The average life span of a red cell is 120 days. The daily rate of production and destruction would, therefore, approximate 1/120th part of circulating red cells. It would thus follow that to maintain a steady erythrocytic population, $2{\cdot}6 \times 10^{11}$ new red cells must be formed daily along with 6·4 g. of haemoglobin. Daily destruction of red cells, as a result of normal wear and tear of circulation, liberates approximately 21 mg. of iron, 250 mg. of protoporphyrin and 6·2 g. of globin. Iron and globin are reutilised for the formation of new cells. The protoporphyrin part contributes to the formation of bile pigments, viz., bilirubin in plasma and urobilirubinogen in stool and urine.

The bone marrow, like all other essential human organs, has an enormous power of reserve which

could protect the system from dangers of unexpected haemorrrhages and haemolytic episodes. Under favourable circumstances, bone marrow is capable of increasing its production seven-fold. A normal bone marrow with its potential reserve would thus maintain normal blood values against factors which would tend to deplete the cells. Under less favourable circumstances, there is, of course, some reduction of this reserve power. Viewed in this context anaemia due to any cause would signify failure of normal bone marrow function. Such bone marrow failure or anaemia may be due to (i) inadequacy of haemopoietic material normally conveyed to bone marrow, (ii) disturbed bone marrow function, and (iii) elimination of normal red cells produced in the normal bone marrow through haemorrhage or haemolysis. With bone marrow as the site of red cell manufacture, the haemopoietic factors may be regarded as essential requirements which must be available before bone marrow can possibly function. If anaemias due to causes that disturb bone marrow function are reckoned as medullary (i.e. pertaining to bone marrow), the anaemias due to non-availability of haemopoietic factors may be classified as premedullary. Following a similar sequence of thought, haemorrhage and haemolysis would constitute postmedullary causes of anaemias.

A Working Classification of Anaemia from the Aetiological Standpoint

As a guide to therapy, anaemias in general may be conveniently classified into the following groups:

1. *Premedullary anaemias* (due to deficiency of erythropoietic factors):

Deficiency of erythropoietic factors results from dietary inadequacy, defective absorption or poor utilisation. The important erythropoietic factors are vitamin B_{12}, folic acid (pteroyl glutamic acid), iron, protein and possibly vitamin C. Multiple deficiencies are common in the tropics. Thus dimorphic anaemia (deficiency of iron plus vitamin B_{12} and/or folid acid) may be the commonest form of anaemia in certain places of India. Growing children and pregnant women are particularly liable to deficiency anaemias.

2. *Medullary anaemias* (due to depression or dysrhythmia of bone marrow):

Infections, toxic drugs, chemicals, radiations, leukaemic proliferations, neoplastic involvement, metastatic deposits, myelosclerosis, myelofibrosis, endocrinic disorders (myxoedema, hypopituitarism, Addison's disease), hypersplenism, and renal diseases inhibit bone marrow activity and lead to decreased erythropoiesis. Hereditary haemoglobinopathies (including thalassaemia and hereditary spherocytosis) also represent production anomalies.

3. *Postmedullary anaemias*:

Normal red cells produced by the normal bone marrow may be lost either through haemorrhage or haemolysis. Haemolysis results either (*a*) from intrinsic intra-erythrocytic defects such as hereditary spherocytosis, thalassaemia and related haemoglobinopathic syndromes due to abnormal haemoglobins (Hbs. E and S are found in certain parts of India); or (*b*) from extrinsic extra-erythrocytic mechanisms (infections, toxic drugs, chemicals immunological disturbances; or hypersplenism).

In connection with the above classification, it should be pointed out that in some disease or disorder, more than one factor may operate in the causation of anaemia, viz., in leukaemias, haemoglobinopathies, nephropathies and in syndromes due to deficiencies of folic acid and/or vitamin B_{12}, decreased or defective erythropoiesis is associated with exaggerated haemolysis of malformed cells.

Morphology of Red Cells as a Guide to Diagnosis

Examination of peripheral blood (and bone marrow when indicated), particularly with reference to the size of the red cell and its haemoglobin content, provides useful data for diagnosis and therapy. Attempts to correlate the aetiology of anaemia with the peripheral erythrocytic morphology indicate that for various aetiological factors there are specific morphological changes in the peripheral blood. Thus macrocytic anaemia with megaloblastic bone marrow would usually represent deficiency of vitamin B_{12}, and/or folic. Macrocytosis with normoblastic bone marrow usually suggests liver disease, aplastic anaemia, hypothyroid conditions, acute haemorrhagic anaemias, haemolytic anaemias as also megaloblastic anaemias undergoing specific therapy or complicated with iron deficiency or infection. Macrocytic hypochromic anaemia indicates dimorphic anaemia, liver disease, and aplastic anaemias. Normocytic anaemia indicates infection, acute haemorrhage, haemolysis, hydraemia or marrow hypolasia. Simple microcytic anaemia is usually seen in subacute and chronic inflammatory diseases. Hypochromic (microcytic) anaemia suggests iron deficiency or some sort of hereditary haemoglobinopathy (thalassaemia and allied disorders).

Investigations

1. Thorough clinical and routine laboratory investigations should be undertaken to exclude any systemic disease or cause of anaemia. Special

examinations may be done as and when necessary, e.g., skiagram of the chest to exclude pulmonary tuberculosis, biochemical examination of blood to exclude azotaemia, serological tests for luetic infection, kala-azar, etc.

2. Haematological examination to find out the degree and type of anaemia:

Degree of anaemia: Estimation of haemoglobin, enumeration of total red cells and determination of packed cell volume are necessary to find out the degree of anaemia.

Type of anaemia:

(*i*) Peripheral blood smear examination—Preponderance of large, well stained red cells (macrocytes) with macropolycytes (large-sized hypersegmented neutrophilic granulocytes) or giant metamyelocytes suggests deficiency of folic acid and/or vitamin B_{12} as in nutritional macrocytic anaemia and pernicious anaemia; the presence of megaloblasts is diagnostic. Small deformed red cells with large central vacuoles and scattered pale-looking target cells suggest hypochromic anaemia. Combination of both the features is seen in dimorphic anaemia.

(*ii*) Packed cell volume (P.C.V.; haematocrit value), mean corpuscular volume and mean corpuscular haemoglobin concentration:

P.C.V. is obtained by centrifuging oxalated blood in standard haematocrit tubes at a speed of 2,500 to 3,000 revolution per minute for 30 minutes. It forms the basis for the calculation of M.C.V. and M.C.H.C. which are useful for typing anaemia. M.C.V. (mean corpuscular volume) represents the average volume of a red cell and is expressed in cubic microns. It is obtained as follows:

$$\frac{\text{P.C.V. per 1000 ml. of blood}}{\text{Red cell in millions}}$$

The normal range of M.C.V. for practical purposes is 75-100 and in anaemic subjects with M.C.V. lying in this range, the type is normocytic; when M.C.V. is higher than 100, the type is macrocytic and when M.C.V. is lower than 75, the type is microcytic.

M.C.H.C. (mean corpuscular haemoglobin concentration) represents the haemoglobin concentration of an average cell. It is calculated as follows:

$$\frac{\text{Haemoglobin in g. per 100 ml. of blood}}{\text{P.C.V. per 100 ml. of blood}} \times 100$$

Normal value of M.C.H.C. is 30 to 36 per cent and this range is known as normochromic or orthochromic. Any value of M.C.H.C. below 30 per cent is suggestive of iron deficiency (hypochromia). M.C.H.C. as an indicator of iron deficiency is more dependable than M.C.H. (mean corpuscular haemoglobin; normal value 24 to 33 $\mu\mu$g.) or colour index. By way of illustration representative blood pictures are given in Table 1.

It should be mentioned in this connection that as a guide to rational therapy, it would be unwise to depend too much on these indices. Inherent errors of red cell count may be unduly exaggerated in inexperienced hands leading to gross inaccuracies in the value of M.C.V. and M.C.H. Reference to Table 1 will indicate that with a constant P.C.V. value of 16·0 per cent, depending on variable R.B.C. count, M.C.V. may vary from 64 to 114, i.e., from gross microcytosis to frank macrocytosis. In inexperienced hands, it is neither infrequent nor unusual for registering a count of 2·0 million either as 1·4 or 2·5. It is unfortunate that inherent fallacy of these indices is not sufficiently well-recognised and in certain quarters these values are given undue importance either in lieu of or sometime even superseding the information obtained from the red cell morphology as revealed in peripheral blood examination. *It cannot be overemphasised that for correct haematological diagnosis these indices should supplement and not substitute the blood smear examination.*

3. Examination of bone marrow is especially indicated in all atypical and refractory anaemias. In uncomplicated nutritional macrocytic anaemia, the marrow is hyperplastic and shows megaloblas-

TABLE 1—SHOWING REPRESENTATIVE BLOOD PICTURES OF DIFFERENT TYPES OF ANAEMIA

Anaemia	Haemoglobin (g.%)	R.B.C. (mill.)	P.C.V. (%)	M.C.V. (cu.μ)	M.C.H.C. (%)	Type
Nutritional macrocytic ...	5·5	1·4	16·0	114	34·3	Macrocytic orthochromic
Iron deficiency (hypochromic) ...	4·0	2·5	16·0	64	25·0	Microcytic hypochromic
Iron deficiency (hypochromic) ...	4·0	2·0	16·0	80	25·0	Normocytic hypochromic
Dimorphic	4·0	1·4	16·0	114	25·0	Macrocytic hypochromic

tosis with giant metamyelocytes, macropolycytes, and abnormal megakaryocytes. Hypochromic anaemia shows hyperplasia of malformed and basophilic normoblasts. In dimorphic anaemia features of both may be present. Infections produce granulocytic hyperplasia with diminished erythropoiesis ; L.D. bodies may be demonstrable in 80 to 90 per cent of cases of kalaazar. In aplastic anaemia extreme paucity of normal haemopoietic tissue is characteristic. Leukaemias and leukosarcomas show diagnostic cells.

4. Serum iron level and iron binding capacity of serum are useful in differentiating iron deficiency anaemia from the other types (haemolytic anaemia and anaemia of infection.)

5. Fragility tests of red cells, estimation of foetal haemoglobin, electrophoretic analysis of haemoglobin, Coombs' tests and other related examinations would be necessary to categorise the haemolytic disorders.

Outlines of General Therapeutic Measures

The general measures depend upon the degree of anaemia and the symptomatology. Physical rest, mental serenity, bright environment and general cleanliness are important. Severe anaemia, anasarca and evidences of cardio-respiratory embarrassment call for bed rest which should be enforced till there has been satisfactory clinical and haematological improvement. Easily digestible, low-residue, high protein diet is indicated particularly in nutritional anaemias. Such a diet appears to potentiate the action of haemopoietic drugs. Constipation should be relieved by mild laxatives.

The dyspeptic symptoms, particularly in achlorhydric subjects are relieved by dilute hydrochloric acid, 2 to 3 ml. along with twice the amount of glycerinum pepsini administered twice or thrice daily along with meals. Glossitis and stomatitis which are best relieved by specific haematinics (antimegaloblastic drugs and/or iron) will hardly need additional care. Vitamin B complex, particularly nicotinic acid and riboflavin, may be necessary in patients who would still complain of soreness of mouth and tongue. Cardiorespiratory symptoms are relieved with improvement of the blood picture. Patients with evidences of congestive cardiac failure should be treated with bed rest, salt-poor diet, and potent diuretics. Digitalis may be useful in some cases. Oxygen inhalation traditionally employed does not appear to be useful, because the red cells which alone can effectively transport oxygen are lacking. In severe anaemia, the available red cells are ordinarily fully saturated with oxygen and are not capable of absorbing any more.

Physiotherapy is indicated for proper management of neurological complications and muscular weakness when present.

Other symptomatic measures may be adopted as occasion demands. Intercurrent infections which tend to thrive in chronic anemic and neutropenic states should be controlled with the appropriate antibiotic. Penicillin is the drug of choice. Broad spectrum antibiotics are indicated in infections with penicillin resistant organisms. Care should be taken to avoid or limit the use of analgesics, antipyretics and sedatives which are potentially toxic to the blood cells or their precursors in the bonemarrow.

Blood transfusion—In view of the growing tendency to use blood transfusion as a panacea for all types of anaemia, the general indications of transfusions need be briefly reviewed. It is neither a haematinic nor a stimulant to the bone marrow. Transfused blood raises R.B.C. and haemoglobin levels of the patient and thus relieves anoxia and various consequences thereof. Patient lives comfortably on borrowed blood till he starts forming his own blood. It is thus indicated in all types of severe anaemias where anoxia endangers life, to tide over the critical pariod before specific therapies have had time to improve the blood values. It is indicated in severe anaemias of infection, malignancy and renal disease where eradication of the primary cause may be difficult. It is useful to sustain blood values in all severe forms of anaemia resistant to usual therapeutic schedule. It is necessary for maintaining blood values in aplastic anaemia, thalassaemia and other haemolytic anaemias. Fresh blood is ordinarily preferable to stored blood. For the treatment of neutropenic states, thrombocytopenia and coagulation disorders, fresh blood is essential. Packed red cells are preferable to whole blood particularly when massive or repeated transfusions are needed. Washed red cells are indicated in patients showing reaction to a plasma constituent of blood. Blood is always given intravenously, the amount and speed of transfusion being determined by the requirement and condition of the patient. Intramuscular injection of blood has no place in the treatment of anaemia or any other blood disease. In consideration of the increasing complexities of possible reactions due to iso-immunisation and uncontrollable risk of hepatitis, it would be desirable to rationalise the indications with a view to avoid unnecessary transfusions. Injudicious use of blood transfusion may unnecessarily sensitize the patient giving rise to untoward reactions when real need for transfusion arises.

"Shotgun" therapy—Unfortunately the craze for shortgun therapy with the use of a multipurpose panhaematinic without necessary investigations still persists. Shotgun therapy is mentioned here only to condemn the irrational practice of prescribing such a preparation with sweet name and attractive composition! It includes many substances (viz., copper, molybdenum, vitamins B_1, B_2, B_6, niacin, pantothenic acid) which are unnecessary from the stand point of practical therapeutics and in recommended dosage usually contains too little of the essential erythropoietic factors. Confirmation of the diagnosis by specific therapeutic test is missed, underlying primary cause is liable to be ignored and opportunity for the early institution of specific therapy (e.g. for cancer) lost. Folic acid without vitamin B_{12} included in a panhaematinic may precipitate subacute combined degeneration in a case of pernicious anaemia. Last, but not the least disadvantage, is that the cost of therapy is unnecessarily multiplied.

Outlines of Specific Therapies

NUTRITIONAL MACROCYTIC ANAEMIA (NMA):

This condition for practical purposes represents deficiencies of folic acid and/or vitamin B_{12}, the deficiency of folic acid predominating. Macrocytic anaemia in pregnant women and growing children are variants of this disease, conditioned by the predisposing factors of extra metabolic demands grossly outstripping the available erythropoietic reserve. Therapy of choice is folic acid (orally in the dosage of 20 to 30 mg. daily for 4 to 5 weeks) which along with a good diet will normalize the blood picture in the majority of cases. Supplementary injections with potent whole liver extract (3 to 4 ml. daily or on alternate days × 10) or vitamin B_{12} (100 μg. daily or on alternate days × 10) are indicated in patients with severe anaemia. Vitamin B_{12} is indicated in patients who do not show adequate response to folic acid, particularly in those showing untoward reactions to liver extract. In refractory cases, which in practice are rare, proteolysed liver extract (1 oz. daily for 3 weeks) is useful, particularly in cases showing associated hypoproteinaemia. Therapy should be continued till the blood values attain normal levels. Thereafter a well balanced diet is prescribed and the patient followed up with a view to prevent relapses which though rare are not unknown.

Marmite, stomach extract or intrinsic factor-vitamin B_{12} combinations have no place in the routine treatment of NMA.

PERNICIOUS ANAEMIA (PA):

Therapy of choice is vitamin B_{12} which should be given in adequate dosage till blood values become normal and neurologic lesions disappear. Thereafter maintenance therapy should be continued to fortify the remission and prevent relapses. In view of the possibility of precipitating neurological complication, folic acid alone should never be used in the treatment of PA.

In uncomplicated cases of NMA or PA, iron therapy is not ordinarily necessary.

HYPOCHROMIC ANAEMIA:

Iron therapy, one of the most ancient remedies, still remains the sheet anchor. Best absorbed in ferrous form, iron may be most conveniently administered as tablets, pills or capsules. In solution, ferrous salts are distasteful, readily oxidised and stain the teeth badly. Ferrous sulphate tablets are preparations of choice. The average adult dose is 12 gr. daily, given in divided doses after the two principal meals. For ensuring better tolerance, it is always preferable to start with a small dose (6 gr. daily) and gradually work up to the full dosage in 3 to 4 days' time. Treatment should be continued till the blood picture becomes normal. Thereafter maintenance therapy, in the dosage of 6 gr. daily, should be pursued for three to six weeks to restore the serum iron level and to replenish the depleted iron reserves. Ferrous gluconate which, weight for weight, contains much less elemental iron, appears to be better tolerated than ferrous sulphate. It is, however, more expensive than ferrous sulphate. Ferrous gluconate is indicated in patients showing intolerance to ferrous sulphate. Average daily dose of ferrous gluconate is 24 to 30 grains. The professed superiority of any other iron preparation (viz., molybdate, succinate, glutamate, fumarate and chelated compounds) or of the potentiating adjuvants (viz., vitamins C, B-complex) has never been clearly substantiated.

An average case of iron deficiency anaemia responds very well to ferrous sulphate tablets. Depending upon the degree of anaemia, blood values usually reach normal level in 6 to 8 weeks. If with ferrous sulphate tablets, no significant clinical and haematological improvement ensues within 3 weeks, the diagnosis need be reviewed. The commonest cause of failure of oral iron therapy is absence of iron deficiency, other causes being associated infections, malabsorption and rapidly recurring haemorrhages of severe degree. Parenteral iron therapy is indicated when overt iron deficiency is not amenable to oral therapy.

In infants and small children who are unable to swallow, ferrous sulphate or ferrous gluconate tablet may be crushed and administered after food along with a little liquid glucose or honey. A convenient elixir form in which ferrous iron may be administered to children is as follows:

Dil. hypophosphorous acid	0·6 ml.
Ferrous sulphate	3·0 g.
Dextrose	30·0 g.
Chloroform water	120·0 ml.

In this preparation, oxidation is prevented by hypophosphorous acid and dextrose and ferrous form well maintained for approximately one month. The following dose schedule may be recommended for different ages:

3 - 4 months = 2 ml. thrice daily (=0·15 g. of ferrous sulphate)
6 -18 months = 4 ml. thrice daily (=0·30 g. of ferrous sulphate)
1½- 3 years = 5 ml. thrice daily (=0·375 g. of ferrous sulphate)
3 - 6 years = 6 ml. thrice daily (=0·45 g. of ferrous sulphate)
6 -12 years = 8 ml. thrice daily (=0·60 g. of ferrous sulphate)

In children, ferri et ammon citras may be sweetened with glycerine and given in the following dosage:

3 - 6 months: 0·2 g. thrice daily after food.
6 -18 months: 0·4 g. thrice daily after food.

Vitamin B complex, vitamin C, copper, cobalt, and other trace elements have no place in the routine management of an average case of hypochromic anaemia. Addition of these substances to ferrous sulphate tablets is irrational and unjustifiable. Vitamin C which as a reducing agent helps in the absorption of complex dietary iron does not appear to augment the action of easily absorbable simple ferrous iron. Enough of the various trace elements is present as contaminant in an average sample of ferrous sulphate.

Parenteral iron therapy—Saccharated iron oxide first introduced in 1947, has since been used extensively. Its use in practice appears to be limited. Genuine indications for parenteral therapy are (a) intolerance to oral iron and (b) failure of oral iron to effect significant improvement of haemoglobin level. Possibility of undesirable side reaction strongly interdicts the preferential use of intravenous iron therapy. The indications for iron therapy with reference to the existence of iron deficiency should be critically reviewed before prescribing intravenous iron. There is no scope for prescribing intravenous iron on an empirical basis and such injudicious step must be deprecated. In this connection it may be pointed out that *at present there is a lot of misuse or overuse of parenteral iron.* Total dose of parenteral iron is calculated by assuming that 100 mg. of iron raises the haemoglobin by approximately 4 per cent (0·59 g. per cent). An additional 500 mg. may be given for replenishing the iron reserve of the body. Another convenient way of calculating total dosage in g. is to multiply the calculated iron deficit (normal haemoglobin minus initial haemoglobin in g. per 100 ml.) by 0·255. Thus the total dosage of iron necessary to raise the haemoglobin level from an initial level of 5·0 g. to 15 g. would be 2·55 g. or 2,550 mg. The first intravenous dose should not be more than 25 mg. and maximum single dose should not exceed 150 mg. in an average patient.

Recently an intramuscular preparation, iron-dextran complex, has been introduced. Administered deep into the muscles, maximum dose of as much as 250 mg. may be given in a single injection. On the whole, untoward reactions are less common than those with intravenous iron. In small children and obese persons, intramuscular therapy is ordinarily preferred. *In experimental animals (rats and mice), intramuscular iron has recently been shown to induce sarcoma at the site of injection.* (Editorial: *J. Indian M. A.*, **33**: 192-93, 1959). This information is very disquieting, though no sarcoma has yet been reported in human. In the best interests of the patients, it would be nevertheless desirable not to use intramuscular iron except under exceptional circumstances.

In all cases of hypochromic anaemia, every attempt should be made to exclude sources of blood loss. In the adult male, hypochromic anaemia is almost always due to blood loss in some form or other. Bleeding from gastrointestinal tract either from ulcers, varices, neoplasia or hookworm infestation appears to be a common cause of hypochromic anaemia in man. Treatment of hypochromic anaemia is not complete unless an exact cause has been found out and the same eradicated.

DIMORPHIC ANAEMIA:

Adequate dosage of iron should be given along with folic acid/or whole liver extract.

In sprue, parasprue, coeliac disease and idiopathic steatorrhoea, the blood picture is usually macrocytic with or without hypochromia, suggesting that anaemia is due to deficiency of antimegaloblastic factors and/or iron. The relative proportion of the deficiency factors can usually be

made out from blood and bone-marrow studies. Along with appropriate dietotherapy, these patients should always be treated with folic acid, vitamin B_{12} or whole liver extract. Iron should be given when needed.

MEDULLARY ANAEMIAS :

In this group, there is no dearth of erythropoietic factors and there is no point in prescribing haematinics. The exact nature of the inhibitory factor need be found out and properly dealt with. Anaemia in this group is mostly symptomatic of and secondary to a wide variety of clinical conditions already listed. Control of the primary cause will lead to spontaneous cure of anaemia. Severe anaemia in the initial stage should be treated with blood transfusions which alone can effectively improve the anoxic and other symptoms.

Cobalt chloride (4 ml. of 2½ per cent solution contains 100 mg.) has been used in the treatment of refractory anaemias. In anaemias of infection, malignancy and renal disease as also in haemoglobinopathy, oral administration of 50 to 150 mg. of cobalt chloride for a period of 3 to 6 weeks temporarily raises the red cell count and haemoglobin level which, however, wear off on withdrawal of therapy. The possibility that cobalt-induced erythropoiesis may be an unphysiological response mediated through bone-marrow anoxia argues strongly against the use of cobalt in any of the above conditions.

APLASTIC ANAEMIA :

Attempt should be made to find out the cause, viz., infection, toxic drug, exposure to radiation or other noxious agents and to eradicate it. In this condition, there is no specific therapy that would stimulate the marrow. The following measures may be of some use: (a) steroid hormones—prednisone 20 to 30 mg. (or equivalent dosage of dexamethasone) daily for adults for 4 to 6 weeks or for longer periods depending upon the response ; (b) male sex hormone—Perandren 25 to 50 mg., I.M., on every 3rd day for 2 to 3 months or more ; (c) bone marrow transplants—aspirated material from normal human marrow may be directly injected into the bone marrow of patients. Such injection may have to be repeated many times (The scope and value of intravenous infusion of a large number of bone marrow cells are still mostly experimental) ; (d) in refractory cases splenectomy may sometimes be partly beneficial.

Available therapeutic measures are unsatisfactory and far from curative. The noxious agent damaging the bone marrow is not always easy to identify. It the damage has been mild, recovery is expected. In case of severe damage, the aplasia is irreversible. During the critical period, the patient should be carefully maintained with repeated transfusion of fresh blood and antibiotics as and when necessary.

HAEMORRHAGIC ANAEMIAS :

Adequate iron therapy along with eradication of the cause of haemorrhage is the sheet anchor. In acute haemorrhages of severe degree, blood transfusion is indicated to guard against vasomotor failure and to control haemorrhages due to defective haemostatic mechanism.

HAEMOLYTIC ANAEMIAS :

Where haemolytic anaemia is due to intra-erythrocytic defect, the treatment depends on the nature of the defect. In hereditary spherocytosis, splenectomy successfully halts the haemolysis and effects a clinical cure. Anaemia and jaundice disappear and patient is symptom-free. Spherocytes however, persist, but in the absence of spleen these appear to have a normal life span and are not destroyed early. In thalassaemia syndrome, treatment is unsatisfactory. In severe forms of the disease, periodic blood transfusion will be necessary to keep the patient symptom-free. Splenectomy is only partially useful in cases with massive splenomegaly, pronounced haemolytic component and evidences of hypersplenism. In sickle cell anaemia, the therapy is limited virtually to blood transfusion for improving the anaemia temporarily ; splenectomy in a few cases with marked splenomegaly and jaundice may produce slight improvement.

In other hereditary haemoglobinopathies (C, D, E, G, H, I etc.) the anaemia is usually slight and no active treatment ordinarily indicated.

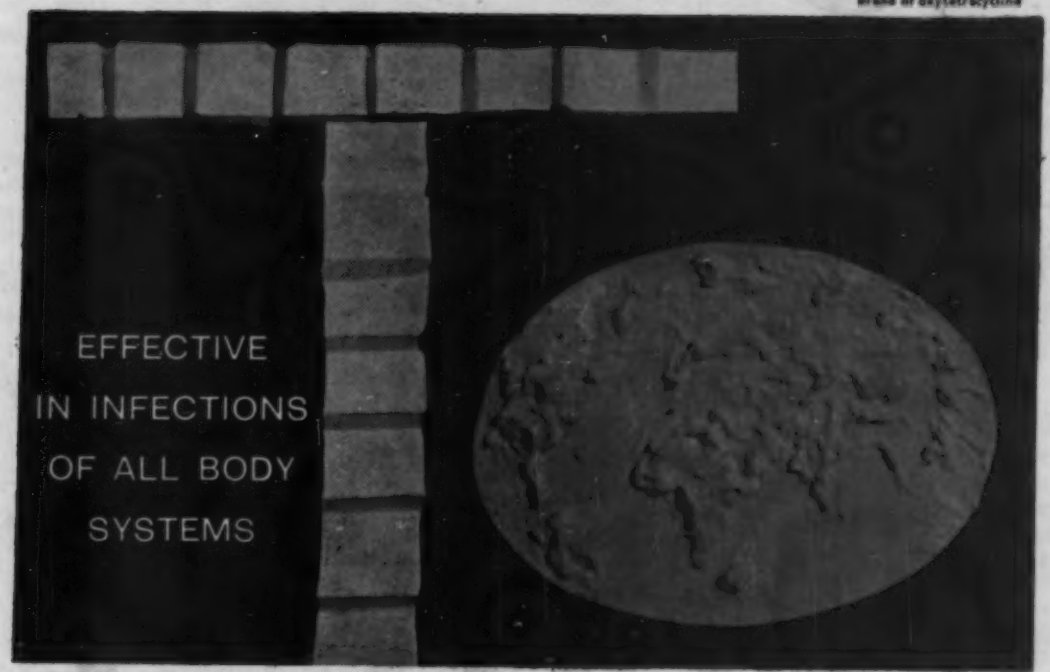
When abnormal haemolysis results from extra-erythrocytic cause, the extraneous factors such as infections, toxic drugs, and other agents, should be controlled or eliminated. In auto-immune haemolytic anaemia, the treatment of choice is with prednisone or dexamethasone group of drugs. Splenectomy is indicated only when the hormones have failed. In hypersplenic haemolytic anaemia, splenectomy is recommended. In erythroblastosis foetalis, the rational treatment is exchange blood transfusion.

In haemolytic anaemias, blood transfusion is essential to sustain the patient during "crisis" and to maintain adequate blood values at other periods. Fresh washed red cells are preferable. Haematinics are useless in haemolytic anaemia.

10 years after its discovery
still the cornerstone
of broad spectrum therapy
throughout the world

TERRAMYCIN*

brand of oxytetracycline



TERRAMYCIN ORAL PREPARATIONS to meet every need...

FOR INFANTS & CHILDREN
FOR THE DEBILITATED & ELDERLY
Delicious, ready to use.
Stable for 2 years.
TERRAMYCIN SYRUP (PREMIXED)
TERRAMYCIN PREMIXED PEDIATRIC DROPS

FOR ALL PATIENTS
Small, easy to swallow, in three potencies
TERRAMYCIN CAPSULES
TERRAMYCIN SP CAPSULES
Fortified with vitamins to meet increased metabolic demands in infections

Also available in a wide variety of topical dosage forms to meet all needs

Pfizer *Science for the world's well-being*

PFIZER EASTERN CORPORATION, New York, Panama & Brussels
Exclusive Distributors in India:
DUMEX PRIVATE LIMITED, 'CICI Building, 163, Backbay Reclamation, Bombay 1

* Trade-mark of Chas. Pfizer & Co., Inc.

Simplified
Sulphonamide Therapy

ONE

one tablet daily

Just one tablet a day affords—

rapid effect
prolonged action
greater safety
potent antibacterial activity

Midikel

(Sulphomethoxypyridazine, Parke-Davis)

Tablets of 0.5 Gm. in bottles of 6 and 50.

PARKE-DAVIS

Conclusion

The essential prerequisite for rational management of anaemias is a clear and complete knowledge regarding the pathogenesis of anaemia. The main objective of therapy should be not only to normalise the blood picture but also to suggest ways and means which will prevent relapses and recurrences. For example, for the treatment of iron deficiency anaemia, the causes of iron deficiency must be found out and eradicated. Unless the causes of iron deficiency (which may be due to dietary inadequacy, malabsorption or haemorrhages) are removed, the treatment should be reckoned as inadequate. Despite the fact that most of the anaemias that are seen in children, in pregnancy and in the general population are largely preventible and easily curable if detected in time, anaemias still continue to be a common cause of morbidity and mortality in India. Poverty, ignorance, multiple pregnancies and lack of proper diagnostic and treatment facilities are important causes that continue to perpetuate this unhappy state of affairs. A properly co-ordinated nationwide drive can only remedy these handicaps and thereby prevent the anaemias and promote national health.

CASE NOTES

MILKMAN'S SYNDROME

R. B. BHAGWAT, M.D.

Assistant Physician, B. J. Medical College & Sassoon Hospitals, Poona

Introduction

Milkman's classical case published in 1930 and 1934 was that of a woman aged 43 whose initial symptoms were pain in the back and lower extremities and a waddling gait. During the first two years of illness no skeletal abnormalities could be recognised by x-ray examination. Thereafter 'ribbon-like zones' of decalcification, many of them symmetrical, appeared. Milkman emphasised the absence of bony deformities and the late occurrence of bone displacement. He defined the syndrome as a "systemic disease involving the entire skeleton, flat and tubular bones, with symmetrical fractures starting in the cortex."

Although Milkman's case had diffused nephritis and a past history of passing renal calculi, it is fairly well established that Milkman's syndrome is a form of osteomalacia. Albright and Reifenstein (1948) have discussed this problem elaborately.

Several cases of Milkman's syndrome have appeared in the literature. The following case is being reported because of its unusual radiological features.

Case Report

Miss L.G.K., aged 14, was admitted on 31-7-1959 with complaints of low backache and pain in the lower limbs—duration two months. The onset was gradual with progressively increasing intensity of pain. The pain was constant and aching and non-radiating. Prolonged sitting, standing or walking aggravated the pain.

The patient started speaking at the age of 12 months and walking at 14 months. No other member of the family had similar complaints. Her diet was mainly vegetarian. The stools were formed and passed once a day. She first menstruated about 2 years ago. Her menstruation was regular, at intervals of 28 days, and lasted 8-10 days. Clots were passed for the first few days.

Clinical examination—She was 4 ft. 7 inches in height, and 80 lb. in weight. She was well-built and well-nourished. There were no bony deformities. Secondary sex characters were normal, her blood pressure was 120/80 mm. Hg and there was tenderness over the lumbar spine. Gynaecological examination, done rectally, showed a prepubertal uterus and normal ovaries. The systemic examination did not reveal any abnormality.

INVESTIGATIONS :

Blood—Hb, 13·5 g. per cent ; W.B.C. count, 4600/c.mm. ; Sternal marrow—normal.

Biochemistry—Serum calcium—11·5 mg. per cent (4-8-59) and 10·0 mg. per cent (26-8-59) ; serum phosphorus—3·2 mg. per cent (4-8-59) and 2·48 mg. per cent (26-8-59) ; serum alkaline phosphatase—22·4 K.A. units (4-8-59) and 16·1 K.A. units (26-8-59) ; serum proteins—total 7·00 g. per cent, albumin 4·30 g. per cent and globulin 2·70 g. per cent ; blood urea—18 mg. per cent (5-8-59).

Urine— Output—1500 cc./24 hours ; reaction—acid ; sp. gr.—1016 ; albumin, glucose and acetone—absent.

Concentraction dilution test—Sp. gr. of concentrated urine—1035 and sp.gr. of diluted urine—1004 ; more thaen ¾ of the ingested water was excreted in the first 4 hours.

Urinary calcium and phosphorus on the low calcium diet—

Calcium—100 mg./24 hours, phosphorus—600 mg./24 hours (4-8-59).

Calcium—108 mg./24 hours, phosphorus—915 mg./24 hours (26-8-59).

Total and differential fat content of the stools—Total—16 per cent (normal 10-25 per cent) ; unsoaped fat—8 per cent (normal 10-15 per cent) ; free fatty acid—4·4 per cent (normal 9-13 per cent) ; fatty acid as soap—8·0 per cent (normal 10-15 per cent ; neutral fat—3·6 per cent (normal 1-2 per cent).

Radiological investigations—All the skiagrams show generalised demineralisation of the skeleton, especially in the spine and the pelvis. Mandible—absence of lamina dura (Fig. 1, *vide* Plate); shoulder girdle—pseudofractures of the lateral border of the right scapula and both the scapular spines (Figs. 2 and 3, *vide* Plate); wrists and knees—normally growing epiphyseal cartilages (Figs. 4 and 5, *vide* Plate); Plan x-ray of abdomen—normal.

Discussion

The unusual radiological feature in this case is the absence of rachitic changes in the growing epiphyses, inspite of the presence of generalised skeletal demineralisation with bilateral symmetrical pseudofractures. The physiopathological basis for this feature should be found in the metabolism of calcium, phosphorus and vitamin D.

In this case there is no deficiency of vitamin D as shown by the normal growth of epiphyses, and the calcium deficiency suggested by skeletal demineralisation does not seem to be due to its excessive loss in the urine or/and faeces.

The mode of action of vitamin D and the mechanism of regulation of calcium and phosphorus balance is far from clear. Migicovsky and Jameison (1955) demonstrated that increased intestinal absorption of calcium is the sole and primary effect of vitamin D. Dixit and Patwardhan (1952) and Dixit *et al* (1956) have shown that vitamin D directly influences the metabolism of cartilage cells by increasing their citric acid content.

In the present state of our knowledge regarding the mode of action of vitamin D and the mechanism of regulation of calcium-phosphorus balance, the physiopathological explanation for the unusual radiological feature of this case is a matter of speculation.

Summary

A case of Milkman's syndrome with unusual radiological feature is presented. This feature needs a physiopathological explanation.

Acknowledgment

My thanks are due to Dr. C. L. Modi, Dean, B. J. Medical College and Sassoon Hospitals, Poona, for allowing me to make use of the hospital records; to Dr. D. B. Desai, Lecturer in Biochemistry, B. J. Medical College, Poona, for his valuable guidance and to Mr. Mungle, Biochemist, Department of Pathology, B. J. Medical College, Poona.

References

Albright, F. and Reifenstein, E. C. Jr.—The parathyroid glands and metabolic bone disease, Selected Studies, 1948. Williams & Wilkin's, Baltimore.

Dixit, P. K. and Patwardhan, V. N.—*Indian J. M. Sc.*, **6**: 107, 1952.

Dixit, P. K., Joshi, J. G. and Patwardhan, V. N.—*Indian J. M. Research*, **44**: 716, 1956.

Migicovsky, B. B. and Jameison, J. W. S.—*Canad. J. Biochem. & Physiol.*, **33**: 202, 1955.

TAKAYASHU'S SYNDROME

S. J. DAMANY, M.D., F.C.P.S., F.C.C.P. (U.S.A.)

AND

R. M. SHAH, M.D.

School of Post-Graduate Medicine and Research Sheth Vadilal Sarabhai General Hospital and Sheth Chinai Maternity Hospital, Ahmedabad

In 1908, Takayashu described a peculiar entity characterised by absence of pulsations in the carotid and radial arteries. The synonyms included segmental thromboobliterative disease of the aortic arch, pulseless disease, aortic arch syndrome, Martorell's syndrome and reverse coarctation.

Although the condition was mentioned by Broadbent in 1875, it was Takayashu in Japan who reported the syndrome in greater details in 1908. Until recently very little attention was drawn to this disease entity. Shimizu and Sano (1951) drew the attention of the medical profession to this syndrome as the 'pulseless disease'.

Not more than 100 cases have so far been reported in the literature. In India only five cases have been published—one by Sengupta and Ghose (1957), one by Shikhare (1921) and three cases by Misra, Satyaprakash and Agarwal (1959).

Aetiology of this condition remains obscure. The various factors considered to be responsible are syphilitic aortitis with or without aneurysm, non-specific panarteritis, thromboangiitis obliterans, atheromatosis, trauma and allergic reactions. Even changes like polyarteritis nodosa and temporal arteritis are incriminated.

Whatever be the exact pathological cause, the process appears to be fairly well localised, involving primarily the innominate, carotid and subclavian arteries. The disease rarely extends beyond the course of these vessels in the neck and proximally it is limited to their origin from the aortic arch.

This syndrome is usually encountered in young females and hence the term female arteritis. However, more recently, it has been found to occur even in males and at various age periods.

The clinical manifestations are rather protean, depending upon the nature and extent of the obliterative process and the adequacy of collateral circulation. Of course, the classical findings are the absence of pulsations in the radial and carotid arteries.

The symptoms arise from ischaemia of the upper half of the body, and is manifested by rapid exhaustion and pain in the upper extremities, easy exhaustion and pain in the jaws, aged appearance of the face and perforation of nasal septum. The neurological, disturbances resulting from cerebral ischaemia vary considerably from relatively mild symptoms of headache, vertigo and fainting attacks to more severe convulsions, aphasia, and actual paralysis. Hemiplegia is occasionally encountered.

Ocular disturbances range from photophobia to blindness. Skin and muscle atrophy may result from inade-

quate collateral circulation. The most striking findings in the upper extremities are absence of pulsations and blood pressure.

Insidious in onset, the disease tends to assume a slowly progressive course extending over a number of years with gradual increase in symptoms—cerebral ischaemia being the most common cause of death.

Collateral circulation is manifested by visible or palpable superficial arteries. Systolic bruit may be heard between the clavicle and the sternomastoid muscle.

Treatment of the disease is mainly surgical. Obviously, effective therapy must be directed towards restoration of normal blood flow, an object which is best achieved by surgical means. Our experience in surgery of this disease is too limited to recommend any specific method with confidence. However, thrombo-endarterectomy after sacrificing external carotid may be tried.

Case Report

G., male, aged 40, was admitted into our ward with complaints of weakness of all the extremities—more marked on the right side, difficulty in speech, and considerable mental confusion. The total duration of illness was about three months. After a mid-night drinking bout, he was found in a state of semiconsciousness and mental confusion. Weakness of the right limbs was noticed which gradually increased and later involved the other extremities.

The patient had an attack of hemiplegia one year back from which he completely recovered in a couple of months. No definite history of venereal disease was available.

On examination, he was found conscious but utterly confused. Though fairly well oriented to time and place, he replied in monosyllables with very vacant and expressionless look. He repeated the words he spoke or was spoken to.

All the cranial nerves were normal. There was weakness of all the limbs, most marked on the right side with hypertonia. There was no wasting, no abnormal movements, or no trophic changes. No sphincter disturbances were noticed.

Deep jerks were exaggerated on the right side. Babinski was positive on the right side and equivocal on the left side. Other superficial reflexes were lost on the right side.

Sensory system was found to be normal.

Examination of the cardiovascular system revealed complete absence of pulsations in the right radial, right brachial and right carotid arteries. Blood pressure was not available on the right side, but was normal (110/70) on the left side. Blood pressure in the lower extremities was equal on both sides and normal.

Investigations :

R.B.C.—4·6 million/c.mm. ; Hb.—86 per cent, W.B.C.—9,400/c.mm. with poly. 60 per cent, lympho. 36 per cent, eosino. 2 per cent and mono. 2 per cent.

Urine examination report was normal.

X-ray of skull (A.P. and lateral views) revealed no abnormality.

C.S.F.—Pressure was normal with one cell/c.mm., proteins 90 mg./100 c.c., sugar 53 mg./100 c.c. and chlorides 760 mg./100 c.c. ; C.S.F. Wassermann test was positive ; C.S.F. colloidal gold curve : 000,000,0000 ; Blood K. T. + + + + + (twice repeated).

Arteriography—Cardiac catheter was introduced from right brachial artery (by open dissection) as far as the origin of right subclavian artery. From the catheter, radio-opaque dye was injected and skiagrams of the neck and chest obtained (Fig. 1, *vide* Plate). The arteriography showed on the right side :

1. A small stump of the common carotid.
2. Complete blockage of the internal carotid.
3. Normal external carotid.
4. Numerous collaterals in the axillary and cervical regions.

Comments

The patient presented to us with pyramidal affection on the right side, mental confusion and complete absence of pulsations in the right radial, brachial and internal carotid arteries. Though one would expect pyramidal lesions on the left side with arterial block on the right side, one can explain these changes with similar small thrombotic lesions higher up in the cerebral circulation.

Absence of arterial pulsations on one side with neurological and mental manifestations led us to suspect 'pulseless disease'.

We confirmed this with arteriography which showed definite block at the origin of the internal carotid and subclavian arteries on the right side. The cause of the thrombotic block in this case appears to be syphilitic in nature. This is borne out by strongly positive Kahn test.

Summary

A brief resume of the literature on Takayashu's syndrome is presented.

A case of this syndrome is presented.

The arteriography in this case showed definite block.

The actiology of the syndrome in the present case appears to be syphilitic in nature.

Acknowledgment

Our thanks are due to Dr. M. D. Desai, Director, School of Post-Graduate Medicine and Research, Sheth Vadilal Sarabhai General Hospital and Sheth Chinai Maternity Hospital, Ahmedabad, for permission to report this case.

REFERENCES

BROADBENT, W. H.—*Trans. Clin. Soc.*, **8**: 165, 1875.
MISRA, S. S., SATYAPRAKASH AND AGARWAL, P.—*Am. Heart J.*, **57**: 177, 1959.
SENGUPTA, S. N. AND GHOSH, J. C.—*Brit. M. J.*, **1**: 137, 1957.
SHIKHARE, P. V.—*Indian J. Med.*, **2**: 320, 1921.
SHIMIZU, K. AND SANO, K.—*J. Neuropath. & Clin. Neurol.*, **1**: 37, 1951 (Abstracted, *J.A.M.A.*, **145**: 1098, 1951).
TAKAYASHU, M.—*Acta soc. ophth. Jap.*, **12**: 554, 1908.

HYPERTENSION ASSOCIATED WITH STENOSIS OF THE RENAL ARTERY

V. C. VASANTHA, B.SC., M.B.B.S.
Tutor in Pathology
V. KAMESWARA RAO, M.D.
Lecturer in Forensic Medicine
AND
D. J. REDDY, M.D.
Principal and Professor of Pathology
Guntur Medical College, Guntur

Peart (1959) in his Goulstonian Lectures entitled 'Hypertension and Kidney' emphasises the need of detecting or excluding all causes of renal damage, before a patient is condemned with the label of primary or essential hypertension. He has given an admirable account of the kidney in hypertension, and classified the causes of kidney damage primarily based on his surgical material. Glomerulonephritis, polycystic disease of the kidney, pyelonephritis, polyarteritis nodosa, intercapillary glomerulosclerosis, radiation nephritis, systemic lupus, scleroderma, toxaemia of pregnancy and tuberculosis of the kidney are some of the conditions promoting hypertension. The lesions are often bilateral and surgical interference is contraindicated. Patients have therefore to be contented with hypotensive drugs. In pyelonephritis of one kidney nephrectomy helps greatly in restoring the blood pressure towards normal.

Atheromatous change in the renal artery usually occurs close to its origin from the aorta, and may be unilateral or bilateral. It may be complicated by a thrombus of the aorta extending to the origin of the renal artery. The stenosis of the renal artery is an important factor in the production of hypertension. Peart (1959) stressed the importance of the liberation of a pressor enzyme from the partially infarcted kidney caused by occlusion of the renal arteries. He pointed out the importance of screening all suspected cases of unilateral renal damage responsible for hypertension and presented excellent illustrations on renal arteriograms, aortograms, pyelograms, and histological features of renal infarct of his cases. The diagnostic value of aortography and renal arteriography in locating thrombus in the aorta or renal artery, or stenosis of the renal artery cannot be overemphasised. Nephrectomy cures hypertension in a large percentage of unilateral renal disease. Reconstruction of obstructed renal arteries offers a hopeful approach to the treatment of hypertension. Nephrectomy is preferable when the other kidney is healthy, because of the risk of recurrence of the vascular lesion, or of permanent damage to the diseased kidney.

FIG. 1—SHOWING CONCENTRIC HYPERTROPHY OF THE HEART (POSTERIOR ASPECT)

At necropsy we found atheromatous changes in the renal artery with thrombus in a case clinically diagnosed as malignant hypertension. The findings are reported.

CASE REPORT

T. A. R., male, aged 50, was admitted under the care of Dr. C. Sambasiva Rao on 13-5-59 with history of dyspnoea for the last six months, and jaundice, fever and vomiting since 7-5-59.

Physical examination—The feet were oedematous. Apex beat was located in the anterior axillary line. A diastolic murmur heard over the mitral area was not conducted. Soft diastolic murmur was heard over the aortic area and was conducted along the left sternal border. Pulse was 100 per minute, regular and non-collapsible, with high tension. Blood pressure was 210/120 mm. Hg. Rales were heard in both bases of the lungs.

Laboratory findings— Urine—Albumin, urobilinogen and bile salts were present. R.B.C., and granular and hyaline casts were seen.

Blood—Blood urea was 70 mg. per cent, bilirubin 3 mg. per cent, and thymol turbidity 3 units.

Clinical diagnosis—Malignant hypertension with heart failure.

Fig. 1—Skiagram of the mandible which shows that the lamina dura is absent.

Fig. 2—Skiagram of right shoulder girdle showing pseudofracture of scapular border and spine.

Fig. 3—Skiagram of left shoulder girdle showing pseudofracture of scapular spine.

Fig. 4—Skiagram of the wrist showing that the epiphyseal line is normal.

Fig. 5—Skiagram of the knee showing normal epiphyseal line.

BHAGWAT—*Milkman's Syndrome (p. 123)*

Fig. 1—Arteriography showing a small stump of the common carotid, complete blockage of the internal carotid and normal external carotid.

DAMANY AND SHAH—*Takayashu's Syndome (p 124)*

Fig. 2—Segment of aorta with the kidneys showing hardly any lumen in the right renal artery (the thrombus was dislodged for histological study) The right kidney is disproportionate in size and its surface is uneven.

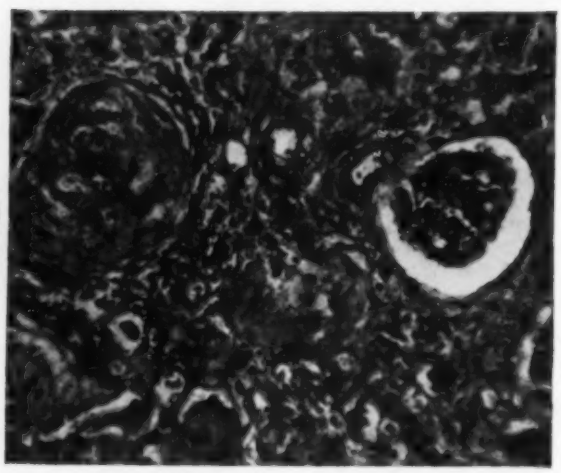


Fig. 3—Photomicrograph showing hyalinised glomerulus, arteriosclerotic occlusion of vessel and interstitial fibrosis. (H & E × 100)

VASANTHA *et al*—*Hypertension Associated with Stenosis of the Renal Artery (p. 126)*

ENGRAVED & PRINTED BY REPRODUCTION SYNDICATE, CALCUTTA 6

The patient was treated with adequate dosage of aminophylline, serpasil, digoxin and penicillin, but expired on 10-7-59.

Morbid anatomy—The heart showed concentric hypertrophy (Fig. 1). The aorta presented extensive atheromatous plaques, ulceration, calcification and intimal haemorrhages, which were histologically confirmed. The iliac arteries showed atheromatous ulceration and calcification. The lumen of the renal arteries especially on the right side was considerably narrowed. The arteries showed extensive atheromatous changes and calcification. A thrombus was found at the origin of the right renal artery. All these findings were histologically confirmed. The right kidney weighed 100 g. and was considerably reduced in size. The left one weighed 180 g. and showed evidence of compensatory hypertrophy (Fig. 2, *vide* Plate). The stripped surface of the right kidney was granular and presented decortication phenomena. Sections of the kidney showed arteriolar sclerosis, hyalinisation of the glomeruli, periglomerular fibrosis, interstitial fibrosis and round cell infiltration, more marked in the right kidney (Fig. 3, *vide* Plate). There was congestion of the intertubular vessels.

Both the lungs showed infarcts. Close to the infarcted area bronchopneumonic consolidation of the lungs was seen histologically. The rest of the areas showed congestion and the alveoli contained heart failure cells. The peritoneal cavity contained over 3 litres of clear fluid. The liver was reduced in size and weighed 950 g. and sections showed evidence of chronic venous congestion. Appearance of the spleen was typical of chronic venous congestion.

Comments

Atherosclerotic narrowing of the renal arteries, more marked on the right side, is a part of the generalised lesion noticed in the aorta and iliac arteries. It was not possible to push even the thinnest probe through the right renal artery at its origin, where the thrombus was firmly adherent to the vessel wall. The stenosis of the right renal artery accounts for the hypertension in this case. Thrombosis of the renal artery is said to precede the malignant phase of the condition, which is ushered clinically by the sudden onset of pain in the loin, fever, leucocytosis and appearance of red blood cells in the urinary sediment. It is difficult to state categorically that renal atherosclerosis, stenosis and thrombosis were the causal and not the complicating factors. The clinical history and histological findings of the right kidney did not confirm the suspicion of malignant hypertension in this case. Renal artery stenosis could have been suspected while the patient was alive. The difference in size of the two kidneys, demonstrated by intravenous pyelography, is a feature much stressed by Peart in the clinical recognition of renal artery stenosis. Loud systolic murmur over the stenosed arteries, heard anywhere from the xiphisternum to the navel on either side of the middle line, should always be searched for.

Fever observed in the patient is due both to infarcts of the lungs and bronchopneumonia. Jaundice is a manifestation of the chronic venous congestion of the liver.

Summary

Review of the literature on hypertension and kidney, with special reference to stenosis of the renal artery, is recorded.

Clinicopathological findings in a case of hypertension due to stenosis of renal artery associated with thrombus formation are recorded. A plea is made for early detection of this condition so that appropriate surgical measure could restore normal blood pressure.

Acknowledgment

We acknowledge the help received from Dr. C. Sambasiva Rao, Hon. Professor of Medicine, Guntur Medical College.

References

Peart, W. S.—*Brit. M. J.*, **2**: 1353, 1950.

Idem—*Ibid.*, **2**: 1421, 1959.

PROPOSED I.M.A. STUDY TOUR OF THE U.S.A.

It may be possible this year to organise a Study Tour of the U.S.A. for members of the I.M.A. in collaboration with the World Medical Association and the American Medical Association. The Tour will last about 30 days visiting important Medical Centres in the U. S. A. and returning via Japan, starting from India about the end of September or early October. Application for Foreign exchange, etc., has been made to the Government of India and the number of participants will depend on the permission granted. The total cost of the Tour is likely to be approximately Rs. 12,000/- per head.

Members desirous of availing of this opportunity are advised to provisionally register their names with the undersigned by August 15, 1960 giving the following details: (1) Name and address, (2) Age, (3) Qualifications and speciality and (4) Certificate of membership of I.M.A. from the local branch.

Indian Medical Association
"Hanging Bridge", Daryaganj
Delhi - 6

Sd/- A. P. Mittra
Hony. General Secretary
Indian Medical Association

JOURNAL OF THE
INDIAN MEDICAL ASSOCIATION

CALCUTTA, AUGUST 1, 1960

OCCUPATIONAL HEALTH

Occupational medicine is not a discipline in itself. It deals with the health of the industrial worker in relation to his occupation, the chief aims being the protection and promotion of the health of the worker, utilising him for maximum efficiency with safety to himself and to his fellow workers; and rehabilitation of and restoration to gainful employment the occupationally ill or injured worker.

The remarkable spread of industrialisation throughout the world poses this problem of health of the worker before the State as well as the medical profession. Naturally there is a growing interest in occupational health and recognition of its importance is in evidence.

As a result of technological progress, the harmful effects of substances manufactured and handled in industry are increasing at a terrifying rate, and we are becoming more and more instrumental in poisoning "the air we breathe, the water we drink, and the food we eat". The health effects of the various substances, acting singly or in combination, require to be studied with regard to their power to cause or to aggravate the so-called natural diseases. This would serve to guide more soundly the health examination and placement of workers and the development and application of measures for environmental control and personal protection.

Since the early days, private practitioners working in industrial areas engaged themselves in studying the conditions of work of their patients, and the impact of these conditions on their health. But even in the later part of the 19th century there was practically no organised occupational health services. The conditions then existing in factories were frightful, and nobody paid any heed to the ordinary rules of sanitation. The question governing floor space, ventilation, hours of work, adequate lighting, dust pollution and other factors were never thought of.

Most of the progress in occupational health has been made during the last thirty years or so. The employers were the first to realise that their production output was directly affected by the physical condition of their employees. So they began to take steps to safeguard the health of the employees. The State then stepped into the picture and enacted necessary legislation. Labour also made demands for certain protection.

Being responsible for the maintenance of the highest possible standards of health, the medical profession considers itself best qualified to judge what will be the physical and mental effects of the environment, working conditions and physical hazards. Professional bodies therefore, set up committees on industrial health for the purpose of standardising measures of health for industrial workers. They also formed an International Committee on Industrial Health, which now works in co-operation with the International Labour Office and the World Medical Association.

Conditions, however, vary from country to country, and it is very difficult to establish standards in occupational health on a world basis. To meet this exigency, the occupational health service has been conceived on a national basis. Dealing constructively with the health of the employees in relation to their work, the occupational health service is intended to protect the employees against health hazards in their work environment and to encourage personal health maintenance. Also it facilitates the placement and insures the suitability of the individuals according to their physical capacities, mental abilities and emotional make-up in work which they can perform with efficiency and without endangering their own health and safety or that of their fellow employees. In addition, it offers adequate medical care and rehabilitation of the occupationally ill and injured. So a vigilant occupational health service promises better health and economic sufficiency for the workers.

The working population of a country forms the bulk of the total population. Workers the world over, especially in underdeveloped countries like India, do not enjoy the full benefits of occupational health services. The onus is on the employer to engage and maintain such a service. This service should be extended to cover as large a proportion as possible of the world's employed population. It should be the aim of all national medical associations as well as the World Medical Association to develop and maintain an improved occupational health service, which will be conducive to the people's health, well-being and productivity as it concerns vitally the national economy. Lastly, the service should be made sufficiently respectable and rewarding to attract in adequate numbers, qualified members of the medical profession. A World Congress of Occupational Health is now being held in New York (July, 1960), for chalking out a sound programme. The question is considered so important that the *World Medical Journal* has devoted a special issue to Occupational Health.

GENERAL PRACTICE DIGEST

TREATMENT WITH DIURETICS

Diuretic therapy is indicated for cardiovascular, renal and hepatic diseases, where there is evidence of fluid retention (subcutaneous oedema, pulmonary congestion, hydrothorax or ascites), but it is not given in acute nephritis. A scheme of treatment is given below:

(A) Diuretic Treatment of Severe Oedema

The choice of a diuretic lies between mersalyl and chlorothiazide. The former is probably better initially. Vomiting due to heart failure or digitalis may complicate oral therapy. It is always easy to change to the oral drug after a few days. Mersalyl is contra-indicated if the blood urea is higher than 100 mg./100 c.c. Both drugs begin to act about two hours after administration, but the duration of effect of mersalyl (24 hours) is twice that of chlorothiazide. In hypersensitivity to mersalyl, chlorothiazide would be preferred. If it is used first, results are often as good, and it is more convenient in domiciliary treatment.

(a) *Parenteral therapy*—Intramuscular mersalyl, 0·5 c.c. (test dose) is given first. If there is no evidence of hypersensitivity, a further 1·5 c.c. may be injected 2 hours later. Further treatment is continued as shown below.

Mersalyl, 2 c.c., I.M., is given on alternate days (if urgent) or twice weekly (if less urgent or improving). Duration of effect of one dose is 12 to 24 hours. Adjuvant therapy consists of ammonium chloride, 1 g., potassium chloride, 1 g., given 2 hours before injection. Potentiation is effected by chlorothiazide or intravenous aminophylline, 0·5 g., given 2 hours after injection.

It is usually not necessary to give mersalyl on alternate days for more than 2 or 3 doses. If the response is inadequate inspite of adjuvant therapy, chlorothiazide may be used for its potentiating effect—biochemical control may however be necessary.

In chronic cor pulmonale, mersalyl (1 c.c. in the first 24 hours) should be used continuously.

(b) *Oral therapy*—The treatment is outlined below. After chlorothiazide has been given daily for 3 or 4 days, intermittent therapy can be started.

Oral chlorothiazide, 1 g. is given twice daily (at 8 A.M. and 2 P.M.). In an urgent case, it is given daily, and in a less urgent or improving case on 3 to 4 days each week. Duration of effect is 12 hours. Adjuvant therapy consists of potassium chloride, 2 to 6 g. Potentiation is effected by mersalyl.

If response is inadequate, potentiation with mersalyl is possible—careful biochemical control is necessary. Alternately treatment with dihydrochlorothiazide can be substituted as shown below. Diuretic potency is not improved by increasing the dose of chlorothiazide. Potassium deficiency is more common with this drug. Potassium supplements are necessary, particularly if treatment is prolonged or combined with mersalyl or steroids.

Chlorothiazide should not be given continuously to cirrhotic patients out of hospital. The dosage of ganglion-blocking agents in hypertensive patients should be halved when it is added to their treatment. Otherwise, severe hypotension may occur.

Oral dihydrochlorothiazide, 50 to 100 mg. twice daily (at 8 A.M. and 2 P.M.). In an urgent case, it is given daily, and in a less urgent case on 3 to 4 days each week. Duration of effect is 12 hours. Adjuvant therapy consists of potassium chloride, 2 to 6 g. Potentiation is effected by mersalyl.

(B) Diuretic Treatment of Moderate Oedema or Long-Term Therapy

This treatment is given to patients with slight or moderate fluid retention or those who require diuretics indefinitely to control oedema.

Chlorothiazide—This is the best diuretic for this purpose. A regime is shown in "A" above. Maintenance therapy is necessary if oedema recurs after omission of diuretics, or for incipient cardiac failure, with basal pulmonary congestion and paroxysms of nocturnal cardiac dyspnoea. Estimation of serum-potassium should be done regularly. If chlorothiazide is given for less than 3 days weekly, fruit juices will provide sufficient extra potassium for the patient with a good appetite.

Intermittent chlorothiazide therapy produces satisfactory diuresis in oedema in pregnancy, with or without hypertension or albuminuria. Women with excessive premenstrual fluid retention are relieved for their symptoms by administration of 0·5 to 1 g. of chlorothiazide for 7 to 10 days before menstruation. In oedema complicating steroid therapy, chlorothiazide administration is unnecessary.

Oral chlorothiazide, 0·5 to 1 g., twice daily. Given on 1 to 3 days each week (supplementary potassium chloride, 2 to 6 g. on treatment days, or if hypokalaemia occurs). Main disadvantage is potassium depletion (especially in cirrhotics). Advantages are that it is potent, and effective by mouth.

Less potent oral diuretics—An alternative scheme for long-term therapy is shown below, if chlorothiazide cannot be given. Weekly mercurial injections potentiate the less potent oral diuretics (chlormerodrin, aminoisometradine) if oedema recurs when either drug is given alone.

Mersalyl, 2 c.c., I.M., given once weekly with oral chlormerodrin or oral aminoisometradine. Main disadvantage is that it can be given only by injection. Adtages are that it is potent and cheap.

Oral chlormerodrin, 1 to 4 tablets a day is given daily or on alternate days. Main disadvantages are gastro-intestinal intolerance and impaired potency. Advantage is that it does not produce any electrolyte disturbance.

Oral aminoisometradine, 400 mg., twice daily, is given daily or at lesser intervals. Main disadvantages are gastro-intestinal intolerance, and impaired potency. Adtage is that electrolyte disturbance is unlikely.

N.B. The chlorothiazide derivatives (dihydrochlorothiazide etc.) are used like the parent drug and the same precautions are necessary. The optimum daily dose of dihydrochlorothiazide is 50 to 100 mg., but up to 200 mg. may be necessary.

(C) Electrolyte Disorders Occurring with Mersalyl and Chlorothiazide Therapy

Hypochloraemic alkalosis occurs with mersalyl, and less commonly with chlorothiazide. This is corrected by giving ammonium chloride, potassium chloride or acetazolamide.

Hypokalaemia occurs with chlorothiazide, and less commonly with mersalyl. This is corrected by giving potassium chloride.

Low salt syndrome occurs with both the preparations. This is corrected by (i) stopping diuretics temporarily; (ii) replacing sodium chloride; and (iii) advising corticosteroid therapy.

From an article by D. Wynne Davies—
Brit. J. Clin. Pract., **13** : 677, 1959.

CURRENT MEDICAL LITERATURE

Digoxin in Ventricular Failure

Ferrer, M. I., Conroy, R. J. and Harvey, R. M. (*Circulation*, **21** : 372, 1960) from the Department of Medicine, Columbia University, College of Physicians and Surgeons and the Cardiopulmonary Laboratory of the First Medical and Chest Services (Columbia University Division), Bellevue Hospital, N.Y., give in the following lines the summary of their observations on the effects of digoxin on the heart and circulation in man :

The acute effects of intravenous digoxin were studied, with use of the cardiac catheterisation technique, in 13 patients with hypertensive or arteriosclerotic heart disease in combined (left and right) ventricular failure. Two patients who in addition had bronchopneumonia were also included to demonstrate the dichotomy between the inotropic effects of the drug and changes in heart rate.

Digoxin produced a rise in cardiac output and a fall in right ventricular end-diastolic pressure in every case.

The readjustments of the pulmonary arterial pressures after the drug were analysed and it became apparent that interrelationship between stroke volume and the degree of pulmonary congestion was the basic variable regulating the several different responses found after digoxin.

Several clinical and haemodynamic considerations bearing upon the whole concept of a 'digitalising' dosage, the relationship between haemodynamic and electrocardiographic alterations of the drug, the inadvisability of using the effect upon ventricular rate as a reliable guide to its cardiotonic behaviour, and the disappearance time of the clinical signs of congestive heart failure in relation to the early haemodynamic improvements were all discussed.

Chlorothiazide as a Diuretic Agent in the Treatment of Congestive Cardiac Insufficiency

Drayer, B. A., Blanco, H. P. and Henriquez, R. S. (*Arch. Inst. cardiol. Mexico*, **29** : 533, 1959, Ref. *J.A.M.A.*, **172** : 871, 1960) write :

Twenty-eight patients with congestive cardiac insufficiency of varied aetiology were treated with chlorothiazide for an average period of one month in the cardiology department of the University Hospital of Caracas, Venezuela. The patients' ages ranged from 12 to 65 years. The daily dose of chlorothiazide was 1 g. for each patient (500 mg. every 12 hours). The treatment was preceded by an observation period of one week, during which the patients were kept on a low-salt diet with a constant sodium and potassium content. The cardiac insufficiency was considered to be compensated when the venous pressure, both at rest and after hepatic compression, was within the normal limits.

The results of the therapy were excellent (decrease of the venous pressure to normal values, total disappearance of the hepatic congestion and of the clinical manifestations of cardiac insufficiency) in 15 patients (53·75 per cent). In 10 patients (35·75 per cent) the results were good, with the venous pressure remaining somewhat higher than the normal values. In only 3 patients was the treatment a failure. In one of these patients the administration of prednisone (30 mg. on the first day, followed by a daily dose of 20 mg. during 23 days) produced an increase in the urinary output and in the excretion of sodium and potassium, resulting in compensation of the cardiac insufficiency. The most constant and important electrolytic change was the increase in the excretion of potassium, without the amount consumed in the daily diet being exceeded. In spite of this ratio, however, hypopotassaemia was observed in 19 patients (67·8 per cent). The patients who were followed up and were kept under chlorothiazide therapy continued to be free from oedema and symptoms of cardiac insufficiency. Unfavourable reactions were few and in no case caused interruption of the treatment or decrease in the dosage. The authors believe that chlorothiazide is as effective as the mercurial diuretic agents, is better tolerated, and is easier to administer. Its effects are more uniform; its side-effects are fewer and less marked.

ACTH-Producing Pituitary Tumors

Nelson, D. H., Meakin, J. W. and Thorn, G. W. (*Ann. Int. Med.*, **52** : 561, 1960) from the Department of Medicine, Harvard Medical School, and the Peter Bent Brigham Hospital, Boston, Massachusetts write :

Ten patients, previously adrenalectomised for Cushing's syndrome, who have subsequently developed evidence of a disturbance of the pituitary gland, have been studied. All of these patients were very deeply pigmented. In eight cases a tumour of the pituitary gland was demonstrable either by roentgenologic examination or by such evidence plus restricted visual fields. In two cases, markedly elevated levels of ACTH were found in association with deep pigmentation, but no tumour of the pituitary was demonstrable. In five of the 10 patients it has been possible to demonstrate a level of plasma-ACTH above that usually observed in Addisonian patients, or in other patients in whom a bilateral adrenalectomy has been carried out. All five patients who did not have elevated levels of plasma-ACTH, but who were deeply pigmented and who did have evidence of pitnitary tumours following adrenalectomy for Cushing's syndrome, had received irradiation to the pituitary gland prior to the time that the first plasma was obtained for ACTH assay. The average time from adrenalec-

Geigy

Irgapyrin

Tablets

are now

sold by

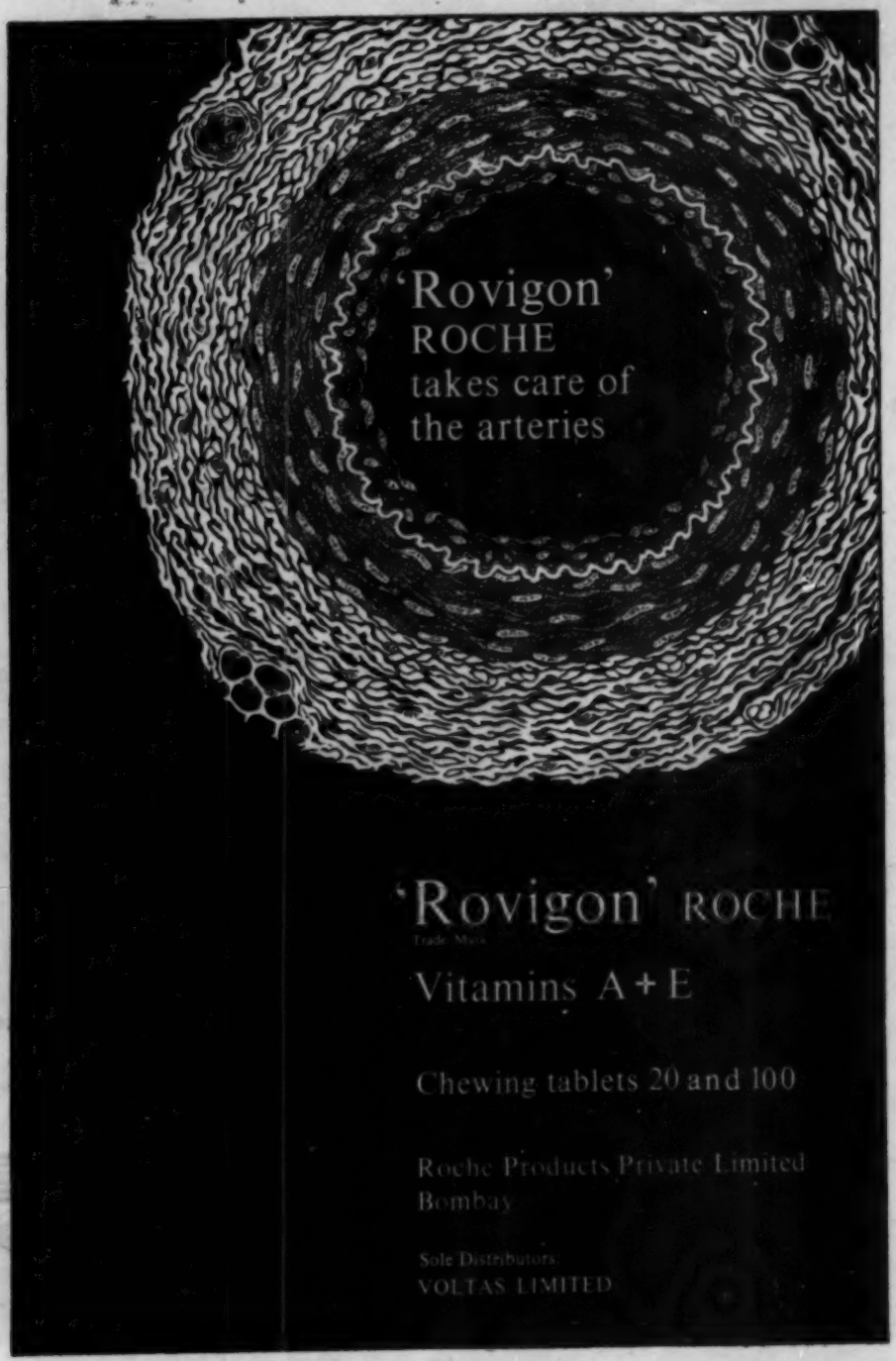
the Trade

in

Strip - Packings

only

GEIGY
Pharmaceuticals are
made in India by
Suhrid Geigy Private Ltd.
Baroda
and marketed by
Suhrid Geigy Trading
Private Ltd, Bombay


'Rovigon'
ROCHE
takes care of
the arteries
'Rovigon' ROCHE
Trade Mark
Vitamins A + E
Chewing tablets 20 and 100
Roche Products Private Limited
Bombay
Sole Distributors:
VOLTAS LIMITED

tomy to the appearance of the pituitary tumor has been three years, with a range of from one to eight years, and, as noted above, pituitary histologic examination in two cases has been reported to show cells of a 'chromophobe type'.

Renal Involvement in Scleroderma

REVINE, R. J. AND ROSNELL, B. R. (*Ann. Int. Med.*, **52**: 517, 1960) from the Department of Medicine, Harvard Medical School, and the Medical Services of the Peter Bent Brigham and the Robert Breck Brigham Hospitals write:

Renal disease is a not uncommon manifestation of progressive systemic sclerosis. Although this renal involvement may run a benign, protracted course, the more common and significant manifestation of this lesion is an acute renal failure, with relentlessly progressive oliguria and azotaemia, often associated with a malignant form of hypertension. In this situation a characteristic triad of lesions is observed in the kidney: (1) intimal proliferation of the small intralobular arteries and arterioles; (2) fibrinoid necrosis involving the walls of the afferent arterioles and sometimes the glomerular loops; (3) focal cortical infarctions. The course when this acute renal lesion becomes clinically manifest is unremittently downhill. Currently available modes of therapy are not apparently effective, and may even be deleterious. Five illustrative cases, of which four were autopsied, are presented.

Testicular Lesions of Periarteritis Nodosa

DAHL, E. V., BAGGENSTOSS, A. H. AND DEWEERD, J. H. (*Am. J. Med.*, **28**: 222, 1960) from the Mayo Clinic and Mayo Foundation, Rochester, Minnesota, give in the following lines the summary of their observations on testicular changes in periarteritis nodosa with special reference to diagrams:

Significant morbid changes were found at necropsy in the testes of forty-one of forty-four male patients with periarteritis nodosa. Abnormalities included specific lesions in the arteries, recent and healed infarcts, diffuse parenchymal obliteration, focal degeneration of testicular tubules, haematomas and haemorrhage. The testes in a fourth of the patients were obviously smaller than normal. Testicular arterial lesions diagnostic of periarteritis nodosa were found in thirty-eight of the forty-four patients (86 per cent).

Symptomatic or objective abnormalities of the testes were noted clinically in eight of the forty-four patients. The rarity of symptoms and signs of testicular abnormalities in other generalised diseases suggests that careful search for testicular pain, tenderness or swelling, or a decrease in size of one or both testes in the presence of evidence of vascular disease in other organ systems may aid in establishing the diagnosis clinically.

It is estimated that the diagnosis of periarteritis nodosa can be made by testicular biopsy in one-fifth of male patients who have that disease. Biopsy of a testis may be considered when a clinical testicular abnormality is apparent in a patient suspected of having periarteritis nodosa who does not present any cutaneous, subcutaneous or muscular lesions. Biopsy should include a portion of the tunica vasculosa and of the underlying parenchyma.

Thyroid Storm

WALDSTEIN, S. S., SLODKI, S. J., KAGANIEC, G. I. AND BRONSKY, D. (*Ann. Int. Med.*, **52**: 626, 1960) from the Hektoen Institute for Medical Research and the Endocrine Clinic, Cook County Hospital, and the Departments of Medicine, Northwestern University Medical School and University of Illinois College of Medicine, Chicago, Illinois from clinical study of twentyone episodes of thyroid storm in 20 hyperthyroid patients observed for a period from 1955 to 1958: Fourteen of 20 'medical storms' were non-fatal, as was one post-thyroidectomy storm. The incidence of storm in all patients hospitalised for hyperthyroidism was 7 per cent. The distribution of patients according to sex and age was comparable to that of hyperthyroidism without storm.

Prestorm thyrotoxicosis was in general severe, and of less than one year's duration. Six patients were under treatment but still hyperthyroid when storm developed. In three-fourths of the episodes, onset of storm was abrupt.

Precipitating factors included infection, surgery remote from the thyroid gland, thyroidectomy, excessive palpation of the thyroid, pulmonary embolism, fear, and reaction to insulin. Important among contributing factors was propylthiouracil withdrawal. No precipitating factor was apparent in nine episodes.

Storm was recognised as a severe exaggeration of all manifestations of hyperthyroidism associated with fever greater than 100°F (in 12 episodes, greater than 103°F.), and marked tachycardia (in 18 episodes, greater than 140/minute). Mental disturbances, congestive heart failure, jaundice and diarrhoea were common. Both multinodular and diffuse goiters of varying size were found.

Symptomatic therapy included maintenance of hydration, control of hyperpyrexia, and relief of anoxia. Specific therapy included intravenous or oral iodide, propylthiouracil, intramuscular reserpine and parenteral ACTH or hydrocortisone. Because of the possibility of adrenal insufficiency, hydrocortisone seems preferable to ACTH. The survivors usually responded to therapy promptly and recovered in an average of three days. In the fatalities, storm lasted an average of seven days.

This study emphasises the need for early recognition and prompt control of hyperthyroidism to prevent storm. Prior to the attainment of euthyroidism, antithyroid treatment should not be interrupted and the patient should be protected against infection, trauma, unnecessary procedures, surgery or other situations which add to the metabolic burden. When these are unavoidable, treatment for storm should be instituted as a prophylactic measure. The mortality rate of storm has been reduced from approximately 60 to 70 per cent to near 25 per cent by the use of reserpine and steroid hormones, in addition to iodine and antithyroid drugs. It is anticipated that the use of these agents whenever thyroid storm is imminent will further reduce the mortality from this serious complication of uncontrolled thyrotoxicosis.

CURRENT TOPIC

THE EPIDEMIOLOGY OF CANCER OF THE LUNG*

A WHO Study Group on Epidemiology of Cancer of the Lung (1960) met in Geneva in November 1959 to review what is known of the aetiology of cancer of the lung, and to suggest ways and means of increasing our understanding of the causative factors.

Cancer of the lung is more prevalent than it was. Official statistics in a large number of countries show a steady increase in the mortality and morbidity rates, and although part of the increase must be ascribed to a greater awareness of the possibility of the disease and so to improved diagnosis it is generally accepted that most of the increase is real. Even in countries where the mortality rates are still relatively low, the tendency is towards an increase.

On the whole, evidence is in favour of the assumption that cigarette smoking is a major causative factor in the increasing incidence of cancer of the lung. While some of the criticisms of this interpretation of the evidence suggest avenues for further research, none can be considered to cast serious doubt on it. Cigarette smoking cannot however be regarded as the only possible factor of aetiological significance. In all countries the incidence of cancer of the lung is higher in urban than in rural areas, and much evidence has been adduced to support the view that pollution of the atmosphere by smoke is another factor of possibly great importance to be taken into account. Chemicals known to be carcinogenic to animals, particularly 3:4-benzpyrene and other polycyclic hydrocarbons, have been found in the air of towns wherever samples have been analysed. Air pollution appears to have decreased and to be decreasing in many countries, and it is desirable that variations in the amount and kind of pollution should be examined before conditions become completely changed. What evidence exists at present on the part played by air pollution in the causation of cancer of the lung appears to indicate that it is or can be a factor of some importance, though it appears to be of less importance than cigarette smoking.

While the parts played by cigarette smoking and by air pollution are still hotly debated, there is no controversy over the increased risk of lung cancer among certain workers in industry. This was first established in the late nineteenth century for miners of radioactive ores, and has been shown to exist for workers engaged in the refining of nickel, the manufacture of chromates and asbestos, and the production of illuminating gas. The incidence of lung cancer is also higher among workers exposed to inorganic arsenic (particularly in concentrations sufficient to produce arsenical dermatoses), and it has been suggested that it is increased by exposure to or association with printing ink, iron dust or fumes, the manufacture of isopropyl oil and beryllium, and the mining and smelting of copper ore. Although it appears to be unlikely that all the industrial risks of lung cancer have been discovered, the contribution of industrial lung cancer to the total incidence is quite small. Nevertheless, a more exact knowledge of the conditions under which these industrial processes cause cancer would probably shed light on the mechanism of carcinogenesis in man.

Many other factors have been held to play a part in the causation of lung cancer: among them ionising radiations from non-industrial sources, chronic pulmonary disease (especially when it produces scarring and metaplasia), and heredity. Sources of ionising radiations include the decay products of radium and thorium, radioactive isotopes dispersed in nuclear explosions, and radioactive potassium and carbon in the body, as well as radiations from diagnostic radiography and radiotherapy and the small amount from cosmic rays. The evidence at present is insufficient to warrant any conclusions about the effect of these forms of radiation on lung cancer.

The same may be said of heredity. Extensive studies of malignant tumours suggest a genetic basis for susceptibility, but do not invalidate the evidence accumulated in favour of environmental factors.

There appears to be some evidence of association between lung cancer and chronic bronchitis and mucosal changes in the bronchi, but the interpretation of this evidence is uncertain. Retrospective studies have failed to reveal any significant association with healed tuberculosis, and follow-up studies have not been sufficiently extensive or prolonged to detect one. We do not know what part, if any, previous respiratory infection plays in increasing the risk of contracting the disease.

Other possible factors that have so far received little consideration are air pollution in dwellings caused by domestic heating and home industry, and substances affecting the bronchi that are absorbed from the skin or alimentary tract.

Increasing our Knowledge of Lung Cancer

In different countries there are marked variations in the mortality from lung cancer, and in several countries where it was previously infrequent mortality is on the increase. Consequently, the Study Group urged, there should be high priority for epidemiological investigations into the reasons for variations, and particularly into the reasons for the increase in incidence. Special attention should be paid to the extent to which already identified aetiological factors may be responsible for this increase.

In some of the countries where the increase in incidence has been marked, the frequency of epidermoid and oat-cell carcinomas has been observed to have increased disproportionately more than that of the other histological types of lung tumour. Professor Kreyberg, of Norway, who has been placed in charge of the International Centre for Lung Tumours established by WHO in Oslo, has suggested that epidermoid and oat-cell carcinomas be classified together as Group I tumours and other types of lung cancer as Group II tumours. The ratio of Group I tumours to Group II tumours may, as studies already indicate, be a sensitive index of an increase in the incidence of environmentally caused

* From the *WHO Chronicle*, **14**: 201, (May) 1960.

lung cancer as between two or more population groups. Where the necessary diagnostic facilities are available, the Study Group felt, studies of the relative incidence of lung cancer should be undertaken by means of the histological techniques developed by the International Centre. Studies are particularly needed in areas where vital and health statistics are not available or where there is reason to believe that lung cancer has begun to increase. The value of these studies would be much enhanced by the simultaneous collection of data about known or suspected aetiological factors. As representative a sample as possible should be taken of cases in a defined population or area, one way of securing this being to obtain data on all new cases diagnosed during a specified period of time.

In some parts of the world where reliable vital statistics are not available, medical care and diagnostic facilities may be sufficiently developed for special morbidity studies of lung cancer, like those on the incidence of cancer among the Bantus of South Africa and among negroes in Uganda and Mozambique. Information about newly diagnosed cases and possible aetiological factors can be obtained from doctors, pathologists and hospitals. This type of study has the advantage that incidence rates are obtained for cancer of each specific site as well as for all forms combined, and the further advantage that the information is about populations as yet unaffected by modern industrial conditions.

Even between countries in which the increase in the incidence of lung cancer began some time ago, there are large differences in rates of incidence. While this is possibly explicable in some cases on the ground that habits of life and extent of industrialisation are different, this explanation will not account for the variations between countries where conditions are more or less similar, such as Finland and Norway: in Finland the death rate from cancer of the lung is about five times as great among males as in Norway, nearly twice as great among females. Epidemiological studies should be made of factors that may influence these variations.

Only in exceptional circumstances is it possible to conduct planned experiments on human beings to test hypotheses about the aetiology of a disease. Clearly, because of the danger to health and because observations would be required over a period of years, they could not be carried out for cancer of the lung. In default of experiments, groups of people might be identified and studied who for some reason or other are exposed to an excessive degree, or on the contrary are hardly exposed at all, to a factor thought to influence the incidence of a disease. Do such groups exist for cancer of the lung? At least one does, in the shape of the Seventh Day Adventists in the United States of America, a religious sect which is prohibited from drinking alcohol or smoking tobacco. There is at present a study being made of several thousand Seventh Day Adventists in parts of California where air pollution is a major problem. Similarly groups undoubtedly exist in other parts of the world, and there are also groups of persons particularly exposed to a specific agent: workers exposed, for instance, to the exhaust fumes of gasoline or diesel engines or to the distillation products of coal. In studies of these groups, information must be obtained on the incidence of lung cancer in the population of which they form part so that a comparison can be made with the general population, and the groups must be large enough to yield a sufficient number of cases to make a comparison possible. In many countries studies would be facilitated if the primary site of cancer were entered in social insurance and pension records for industrial workers, which already usually contain information on occupation.

Cancer of the lung is believed to be caused by multiple factors, so that the simultaneous study of these factors in populations known or thought to be significantly exposed to them is a valuable approach to the problem of aetiology. It should be borne in mind that current cases of lung cancer are probably due to agents operating twenty to forty years ago; information is therefore needed on the time individual members of the group were first exposed to the separate factors to be studied which would include air pollution, the use of tobacco (particularly in cigarettes), and occupational hazards. Widely contrasting environments should be represented; co-operation should be available from an agency with qualified personnel; reliable mortality statistics by age and sex must exist; more than one city in each country or cultural area should be included; and the mobility of the population in each city should be taken into account. Provided that standard techniques are agreed upon, the analysis of air pollution can be carried out in more than one laboratory.

While exogenous factors appear to be responsible for the increase in the incidence of lung cancer, genetic traits may, at least in part, determine who will develop the disease. Genetic studies of twins may also throw light on the role of environmental agents. International collaboration would obviously be needed for studies of twins to produce an adequate number of cases.

Epidemiological studies of a disease like cancer of the lung as a rule single out general factors that affect the incidence, the identification of the specific agents responsible being carried out by laboratory and experimental investigation. This investigation, the Study Group felt, must be encouraged, and it stressed the desirability of standardising laboratory and experimental methods and of conducting experiments, whenever possible, under conditions reproducing the manner of exposure of a human population.

Although much remains to be done in elucidating the causes of the disease, the Study Group held the opinion that there is sufficient well-established knowledge of the aetiology of cancer of the lung to justify prophylactic action aimed at the reduction of exposure to known aetiological agents.

Reference

WHO Study Group on Epidemiology of Cancer of the Lung—*Wld. Hlth. Org. tech. Rep. Ser.*, No. 192, 1960.

NOTES AND NEWS

African Good-Will Trip

A group of Canadians under the auspices of the Canadian Supporting Committee of The World Medical Association are undertaking an extensive tour of Africa. Among their numerous purposes are: To talk to medical men discussing common problems and interests trying to understand their problems and help them see those of the Canadian doctors; and to create and cultivate good-will and understanding with newly formed countries such as Ghana, Nigeria, Congo and others.

International Congress on Nutrition

The Fifth International Congress on Nutrition will meet at the Sheraton Park and Shoreham Hotels in Washington, D.C., September 1 to 7, 1960. Beginning in 1946, former Congresses have been held in England, Switzerland, the Netherlands, and France. This will be the first time one has been held in the United States.

An all-day symposium on 'World Food Needs and Food Resources' will be one of the main features of the scientific programme. The remainder will consist of seven half-day discussions by invited participants, and special sessions at which 370 ten-minute papers reporting unpublished original research will be presented. Further information may be available from the Director of Public Information, Mr. Sidney S. Negus, Medical College of Virginia, Richmond, U.S.A.

Refresher Course for General Practitioners

For the first time, the authorities of the Christian Medical College and Hospital, Vellore, will conduct a Refresher Course for General Practitioners in connection with the Jubilee Celebrations (Diamond Jubilee of the Hospital and Golden Jubilee of the School of Nursing). The course will commence on August 8, 1960 and will last for 5½ days. Many eminent medical men from outside and from the college will conduct the course. The following subjects will be discussed:

August 8, 1960: 1. Chronic Urinary Infection—A Challenge: Dr. Bhat; 2. Indications for Surgery in Cardiovascular Diseases: Dr. Thomas; 3. Hypertension —Medical Management: Dr. Vytilingam; 4. Menopausal and Post-menopausal Bleeding: Dr. Manuel; 5. Simple Diagnostic Approach to Anaemias: Dr. Baker; 6. The Contribution of General Practitioners to Medical Care in India: Dr. Kutumbiah.

August 9, 1960: 1. Hand Infection: Dr. Anderson; 2. The Management of Burns: Dr. Joseph; 3. The Discharging Ear: Dr. Patt; 4. Common External Eye Conditions: Dr. Ebenezer; 5. Early Recognition of Intracranial Space-occupying Lesions: Dr. Chandy; 6. Ischaemic Heart Disease: Dr. Anklesaria; 7. Management of Congestive Heart Failure: Dr. Gordon.

August 10, 1960: 1. Leucorrhoea: Dr. Paranjothi; 2. Planned Parenthood: Dr. Manuel and Dr. Bhat; 3. Problems of the New-born: Asphyxia, Jaundice, Infections and Feeding: Dr. Webb; 4. Acute Respiratory Infections in Infants and Young Children: Dr. Webb; Tuberculosis: (a) Pulmonary aspect: Dr. Gopinath; (b) Genito-Urinary aspect: Dr. Bhat; (c) Orthopaedic aspect: Dr. Rockwell; (d) Paediatric aspect: Dr. Webb.

August 11, 1960: Management in Private Practice: (1) The Diabetic: Dr. Koshy; (2) Common Dermatoses: Dr. Gass; (3) Convulsive Disorders: Dr. Klontz; (4) Uses and Abuses—Antibiotics, Hormones, Steroids: Drs. Gault (Moderator), P. Koshy, T. S. Koshy, David, Fenn, Paranjothi, and Jadhav; (5) Anaesthesia in General Practice: Dr. Lewis; (b) Common Fractures of Extremities: Dr. Rockwell; 7. Surgical Clinical Conference.

August 12, 1960: 1. Hazards of Radiation: Dr. Johnson; Helpful Hints for General Practitioner Laboratories: Dr. Chappel; 3. Immunisation—Present Possibilities: Dr. Webb; 4. The Management of Diarrhoea in Infants and Young Children: Dr. Webb; 5. The Jaundiced Patient: Dr. Narielvala; 6. Labour—Abnormal Uterine Action: Dr. Kunders and Dr. Balasundaram; 7. Medical Clinical Conference; 8. Low Back Pain: Dr. Natarajan.

August 13, 1960: 1. Surgical Abdominal Emergencies —Obstructive: Dr. Fenn; 2. Surgical Abdominal Emergencies—Non-obstructive: Dr. Joseph; 3. New Concepts in Management of Leprosy: Dr. Gass and Dr. Anderson; 4. Psychiatry in General Practice: Dr. Kohlmeyer; 5. Retention of Urine: Dr. Venugopal.

Effects of Caffeine on Brain

If one takes a cup of coffee at 7 in the morning one may not get much additional stimulation from another cup until after 10 o'clock.

This is one of the deductions made from experiments on the effects of caffeine on the brain collected by a Calcutta scientist, Dr. Ajit K. Maiti, during research in collaboration with an American expert at Ann Arbor, Michigan, U.S.A., according to information available in Calcutta. They are believed to be the first scientists to study the neurological effects of coffee.

Dr. Maiti, a former lecturer of Calcutta University, is now a post-doctoral fellow of Michigan University, investigating brain stimulants with Dr. F. Domino, associate professor of pharmacology at the University. His two-year work is being sponsored by the U.S. National Academy of Sciences.

The two researchers found coffee to be quick-stimulating while giving temporary immunisation against further stimulation. The caffeine content of one cup of coffee is said to give peak stimulation in 20 minutes, a condition which continues for about 2½ hours, ending quickly thereafter. But the first cup is also said to partially block the effects of a second cup during this period, a process known to science as tachyphylaxis. There are said to be large individual variations in this time-table.

Malaria Eradication Programme

An agreement was signed on June 30, 1960 at New Delhi between the Government of India and the United States Technical Co-operation Mission for further aid to India's malaria eradication programme.

As a result of this agreement, says an Official Press Release, a sum of about Rs. 40 lakhs was made avail-

able, out of which Rs. 34·3 lakhs will be spent on acquiring from abroad stocks of DDT. The rest of the funds will be utilised for the import of anti-malaria drugs and laboratory equipment.

Burmese Campaign Against Leprosy

Burma is carrying on a vigorous campaign against the rising incidence of leprosy in the country. With a populaion of 20 million, the country has 200,000 lepers of whom nearly 30 per cent suffer from the infectious type, according to official sources.

The most alarming feature was that about 18 per cent of the children in the country were already afflicted with the disease. The rate of increase had been found to be fastest in the Shan States and some dry zones.

The Government in its drive against the disease is being assisted by WHO and UNICEF. Last year about 55,000 patients were treated and the target set for this year is 60,000.

Three Regional Hospitals for Coal Miners

Construction of three regional hospitals for coal miners near Salanpur, Bejdi and Neturia has been recommended by the West Bengal Coalfield Committee. The decision was taken at a meeting held recently. They are estimated to cost Rs. 7 lakhs each. Initially each will have equipment worth Rs. 12 lakhs. It is stated that the department has sufficient funds to take up construction work. The meeting also decided to offer 19 scholarships to children of miners in the Asansol area for technical education.

Expensive Drugs at Cost Price

The Orissa Government has decided to open fair price shops for life-saving drugs in the rural areas. These shops, which will be attached to village hospitals, will supply expensive medicines to patients at cost price.

The decision was taken by the Government following a general complaint that costly life-saving medicines were beyond the reach of poor people in the rural areas.

Synthetic Drugs Factory

Mr. D. Sanjivayya, Chief Minister, told Mr. D. V. Subba Sastry at question-hour on June 25, in the Andhra Pradesh Legislative Council that the Government of India had decided to set up a synthetic drugs factory near Hyderabad, at a cost of Rs. eight crores as early as possible.

Production of Chlorophyll

Two German chemists have discovered the way to produce chlorophyll by a synthetic process, the General Chemical Industry Union announced recently.

Chlorophyll is the mysterious substance which makes plants green. Its essence holds many biochemical secrets. Scientists have been seeking for decades to produce it artificially.

The two chemists made the discovery after 20 years of research. The discovery was 'a great new achievement for chemistry' and of 'inestimable significance for mankind'.

Union Ministry's Stipend Scheme for Public Health Engineers

The Union Ministry of Health has decided to give financial assistance in the form of stipends, fees and other expenses to 340 Public Health Engineers and auxiliary Public Health Engineering personnel studying courses which began on or after April 1 this year.

An official Press release says thirty engineers under training for the M.E. (Pb) degree at the All-India Institute of Hygiene and Public Health, Calcutta, and ten engineers for the M.Sc. degree in Public Health Engineering at the Engineering College, Guindy, Madras, will be given stipends of Rs. 150 per month each for a period of ten months.

Stipends have been sanctioned for not more than ninety engineers for the 3-months courses at the Engineering Colleges at Roorkee and Guindy at the rate of Rs. 150 per month per trainee.

For the engineering subordinate courses at the All-India Institute of Hygiene and Public Health, Calcutta, and at the Engineering Colleges at Roorkee and Guindy, 120 trainees will get stipends of Rs. 100 per month each.

Stipends will be given to not more than sixty water works operators to be trained in short courses of about a month at the regional centres. The value of the stipend per trainee will be Rs. 100 per month.

Thirty stipends of Rs. 75 per month per trainee have been sanctioned for sanitary inspectors to be trained in a short course to be organised at a suitable centre.

Candidates sponsored by the State Governments, Municipal Corporations, Improvement Trusts, local bodies and approved by the Ministry of Health, are eligible for the assistance.

The stipends will, in all cases, be given to candidates in addition to the normal pay and allowances drawn by them from their States.

Madras Medical Council

On a complaint received from the Madura Mills Co. Ltd., Madurai, that Dr. A. D. Victor, L.M.P. (MAD.) 1921, 21 Vaduka Kavalkuda Street, Madurai, had issued a false medical certificate to one Sri Subbiah, sweeper, Pandyan Mills, the Madras Medical Council held an enquiry on 21st March 1960, and found him guilty of infamous conduct in a professional respect and in exercise of the powers conferred on it by section 16(2) of the Madras Medical Registration Act 1914 (Act IV of 1914), the Madras Medical Council directed that the name of Dr. Victor Pillai Athisayam Devadoss, L.M.P. (MADRAS) 1921 holder of Registration Certificate No. 2448 be erased for a period of six months.

Free Mid-day Meals Scheme for School Children in Andhra

The Government of Andhra Pradesh have sanctioned Rs. 3 lakhs for the implementation of the scheme for providing free mid-day meals to children in select schools in the 254 Samithi Blocks of the State during the year 1960-61.

In communicating their sanction, the Government have pointed out that the supply of free mid-day meals to poor children would be an effective incentive to attract children to the school and would go a long way in the successful implementation of the scheme of universal free and compulsory primary education for all children in the age group 6-11 years during the Third Five-Year Plan period.

Tuberculosis Institute in Hyderabad

Mr. K. V. Ranga Reddy, Deputy Chief Minister of Andhra Pradesh, inaugurated in Hyderabad the Institute of Tuberculosis and Diseases of the Chest on May 25. Mr. P. V. G. Raju, Minister for Health and Medical Services, presided over the function.

Major K. N. Rao, Director of Medical Services, welcoming the Ministers said that there were about two and half million infective tuberculosis cases in the country. Reviewing the anti-T.B. measures taken in the State, Major Rao said that at the time of the formation of the Andhra State, there was practically no anti-T.B. programme. About 25 T.B. clinics were established in the State during the past four years. It had been proposed to establish seven more clinics during 1960-61.

The Government of Andhra Pradesh, Major Rao said, had sanctioned the establishment of a rehabilitation centre at Rafat Bagh associated with the T.B. Sanatorium in Vicarabad. It had also been proposed to establish a rehabilitation centre, in the T.B. Hospital in Mangalagiri, Nellore and Eluru. Major Rao said that thoracic surgery centres had been established in King George Hospital, Visakhapatnam, Osmania General Hospital and T.B. Hospital, Irrumnumma, for the surgical treatment of pulmonary T.B. He also added that a scheme for the establishment of similar centres in Guntur and Kurnool was santioned by the Government. He further said that the Government had decided to take T.B. control measures in the Community Development Blocks. As an experimental measure, the Government wanted to establish four community development blocks.

Raman's Technique for Viewing One's Own Retina

Dr. C. V. Raman, famous physicist, has recently developed a new technique by which, without the aid of any instruments whatever, it is possible for a person to view his own retina in action and observe how its different parts function in the perception of colour.

Dr. Raman announced this discovery in a talk in the National Programme on perception of colour broadcast over All-India Radio recently.

Describing the new technique, Dr. Raman said: "The observer sits facing a white screen in a well-lighted room and views the screen through one or another of a suitably chosen set of colour filters held close to the eyes. After allowing a sufficient time for the observer's vision to adapt itself to the effect of the colour filter, the latter is suddenly removed.

"The observer then sees on the screen a highly enlarged image of his own retina, or rather of the physiologically important central part of it, known as the macula lutea. The nature of the image perceived and the colour which it exhibits in different parts depends very much on the colour filter used.

The new technique, Dr. Raman said, had disclosed the existence in the human retina of three different pigments which he named visual pigments. These enable people to perceive the full spectrum of colour extending from extreme violet to extreme red.

After discussing the question of limen or minimum of colour difference which the eye could detect along the spectrum, Dr. Raman inferred that the perception of light and colour involved a simple transference of the energy absorbed by the visual pigment to the neurons in the retina.

Manufacture of Water Dispersible DDT

The National Chemical Laboratory, Poona, has developed a simple process for the preparation of water dispersible DDT for insect control purposes.

DDT crystals are ordinarily, soft and sticky and cannot be easily reduced by simple grinding. The important requirements of water dispersible DDT are high suspensibility in water, sufficient covering power, ready availability on the surface, quick delivery of the lethal dose and high residual toxicity.

This type of DDT has been prepared in the form of an oilbound paste which facilitates the transfer of the insecticide into the body of the insect coming into contact with it.

The manufacturing process is easy and simple and has been tried on semi-pilot plant scale producing 250-300 pounds per day.

Parties desirous of taking up the commercial development of the process are invited to correspond with the Secretary, National Research Development Corporation of India, Mandi House, Lytton Road, New Delhi.

REVIEWS

Medical Terminology for Radiographers—Paul M. Davies, M.B.B.S., D.P.H., F.F.R., D.M.R. 1960; William Heinemann Medical Books Ltd., London; 7½" × 5"; pp. 242; price 15s. net.

The author has explained in a concise and simple manner most of the medical terms used to express anomalies, pathological conditions and diseases.

To radiographers and laboratory technicians having minimum basic knowledge of human anatomy and physiology, the book will impart working knowledge of various pathological processes and will undoubtedly improve their efficiency. This in itself will create better understanding between doctors and technicians.

In the reviewer's opinion this book will be of great help to working as well as student technicians.

B. K. Dey

Pediatric Dermatology –Henry H. Perlman. 1960; Year Book Publisher, Inc., Chicago; 10" × 7"; pp. xii plus 477; price $18.00.

In this book the author has discussed the aetiology, clinical picture, diagnosis and treatment of various cutaneous manifestations especially in children, with beautiful illustrations. The preliminary chapters, viz., principles of dermotherapeutic management, the remedial agents, formulary, are instructive and useful. The chapter on formulary has been written in detail. The book consisting of 30 chapters in all is of 461 pages with an index and will be useful to dermatologists, paediatricians and general practitioners.

The paper, printing and binding are excellent.

A. N. Chakraborty

A Doctor's Approach to Industrial Medicine. 1960; Tata Institute of Social Sciences, Publication Dept., Chembur, Bombay 71; 8½" × 5½"; pp. 151; price Rs. 6·50.

"A Doctor's Approach to Industrial Medicine" is not a comprehensive book on Industrial Medicine but it is a collection of 16 articles drawn from varied writings and lectures of Dr. H. P. Dastur. Truly speaking none of these articles can be considered to be straightforward scientific treatise on Industrial Medicine. Each one of them expresses a philosophical thought on the various problems affecting the wellbeing of the industrial workers. They are more or less the production of a philosopher rather than of a scientist.

Dr. Dastur's connection with industrial medicine is very long. He joined Tata Industries as Medical Officer of Tata Hydro-Electric in 1910, just after his return from England. Being a religious man himself, the hard life of the industrial workers in this country at the time appealed to him. He saw the good work the Industrial Medicine was doing in England and abroad and was naturally tempted to try it in India for the betterment of the industrial workers. His approach to industrial medicine therefore, was more as a philanthropist rather than a scientist.

He was a pioneer in India as far as the practice of industrial medicine was concerned. And like all pioneers he became completely engrossed in his work. Whatever he thought would do good to the workers, he tried to bring it under the purview of industrial medicine.

Dr. Dastur in his article—"Industrial Medicine : its Religious Aspect"—describes the 65,000 textile workers of Ahmedabad prior to the formation of their Union under the guidance of Mahatma Gandhi, as a "rotting mass of humblest and most depressed humanity". He saw Mahatma picked this vegetating mass of humanity and woke them up into action by placing before them a religious ideal to live and die for. This little bit of spiritual idealism did more in course of a few years than all the branches of industrial medicine could do in course of a century. He at once unhesitatingly includes religious teaching in the industrial medicine and says, "Truly, Industrial Medicine is religion rediscovered by science, or at least, should be."

When he sees modern science creating far-reaching socio-economic changes which are not always good for the workers, he becomes completely dubious of the success of modern civilisation which he terms as 'machine-civilisation'. But at the same time when he realises Industrial Medicine cannot progress without the help of science, he advocates complete co-operation with all branches of science for the industrial physicians.

Perhaps Dr. Dastur's idea of Industrial Medicine is best expressed in the last article of this book—"From the Diary of Industrial Physician—2", wherein he says, "The human machine has an emotional side besides a physical one. A mechanical approach seldom touches the right cords of the emotional side and may even play on wrong keys". If looked at them from this philosophical angle, all these articles are worth reading several times over. But to a scientist they are not likely to appeal as they are not written with any scientific background. It is true we cannot always agree with him but it is difficult also to disagree with his arguments. At least all of them make us think; and considered from that angle alone the book is an achievement.

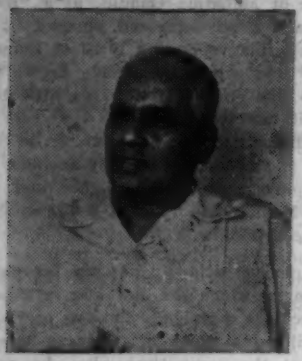
OBITUARIES

Dr. U. B. Narayanrao

Dr. U. B. Narayanrao, ex-Vice-President of the I.M.A. and the Managing Editor of the *Medical Digest*, breathed his last on June 14, 1960, after a short illness.

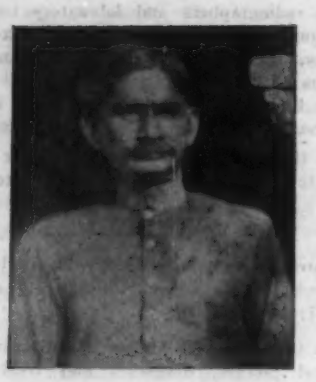
He was born on November 23, 1895 at Udyavar in South Kanara. His schooling was done in his home village and also in Udipi from where he passed his examinations with credit. At Hyderabad, Sind (now in Pakistan), he studied L.C.P.S. After 4 years' course he obtained his diploma and entered the Bombay Government service. After about 20 months he left government service and set up independent practice in Bombay. But he soon found that Bombay would not be suitable for him and he shifted to Girgaum. Here he very quickly made a position in the medical profession.

The treatment meted out to licentiates in government service and elsewhere were repugnant to him and he started a fight for the betterment of conditions of the licentiates. With this idea in view, in 1933, he participated in the All-India Licentiate's Conference held in Bombay and was elected its general secretary. In 1933 he started a monthly medical journal, the *Medical*



DR. U. B. NARAYANRAO

DR. S. N. SEN



DR. S. S. DUTT

Digest. In 1935 he started another journal, *Indian Journal of Venereal Diseases and Dermatology.*

In 1938 he was elected to the Bombay Medical Council. He held this position till 1955 and was nominated by the Bombay Government for a further period of 5 years till 1960. He fought for democratising the Medical Council for establishment of a uniform standard of medical education in the country and for strict adherence to medical ethics.

In 1945, the Government of India nominated him as a member of the Health Survey and Development Committee, and in the same year he was elected as vice-president of I.M.A. (Central). The following year he became the President of the Bombay Branch, I.M.A. During this period the then British Government offered him the title of Rao Saheb which he declined.

In 1950, the Government of India elected him as a member of the Health Panel of the Planning Commission. The Bombay Government nominated him to the Allocation Committee of the E.S.I.C. in 1954. In 1958, he was nominated to the Indian Medical Council and this nomination was extended for a further period of 5 years. He was elected general secretary of the All-India Association of Dermatologists and Venereologists and became the managing editor of the quarterly publication, *Indian Journal of Dermatology and Venereology.* He was elected as a delegate to the Indian Section of the 10th International Congress of Dermatology held in London in 1957 and was elected secretary of the Indian Section of the Congress. He held, that for post-graduate studies, students should not necessarily go to foreign countries as he was of opinion that there was sufficient first grade medical talents in this country, to impart the necessary training. He wanted that medical men should be sent to villages on attractive remuneration.

Dr. Narayanrao had to his credit two popular publications: (1) Materia Medica of Pharmaceutical Combinations and Specialities and (2) Indigenous Medicinal Specialities.

Dr. S. N. Sen

Born at Bhajanghat (Nadia) in 1885, Dr. Sachindra Nath Sen, a member of the Krishnagar branch, I.M.A., breathed his last on May 2, 1960 after a rather short illness.

Dr. Sen passed the M.B. examination of the Calcutta University in 1913 and settled at Krishnagar as a private practitioner. He was conspicuous for his enthusiasm when for the first time in this town a medical association was founded in 1928. It was this organisation which came under the banner of the I.M.A. as a branch, in 1936. Dr. Sen was one of the most active members of the branch and till his death participated in all its functions.

As a medical practitioner Dr. Sen was very popular and earned a respectable position in the town and the neighbouring villages.

Dr. S. S. Dutt

Dr. Sasanka Sekhar Dutt, president of the Madhubani branch, I.M.A., and a leading doctor of North Behar, breathed his last on April 27, 1960 at the age of 70 years. Death was due to peripheral circulatory failure.

Dr. Dutt obtained his M.B. degree from the Calcutta Medical College in 1919 and was appointed in the Behar Medical Service. He was posted at Patna and Darbhanga Hospitals. After sometime he left government service and set up independent practice at Madhubani. In a short time he became very popular. During this period he was also for some years hony. visiting physician of Madhubani jail.

Dr. Dutt always led a pious and honest life. He was widely known for his professional acumen and though a busy practitioner he still found time to devote some hours everyday for the treatment of poor patients free of cost. He was the secretary of the Madhubani Club for 20 years and was intimately connected with many local organisations.

SUPPLEMENT
Journal of the Indian Medical Association

VOL. 35, No. 3 CALCUTTA AUGUST 1, 1960

XII ORISSA STATE MEDICAL CONFERENCE, BHUBANESWAR, 1960

The 12th Orissa State Medical Conference was held on the 16th and 17th April 1960 in the premises of the Kasturba Nari Mohal, Bhubaneswar. Dr. D. R. N. Sahu, President Orissa State Branch presided over the conference. Dr. S. N. Acharya Vice-President, I.M.A. attended the conference on special invitation. Messages of good will were received from Dr. H. N. Shivapuri, President, I.M.A., Sri D. P. Karmarkar, Union Health Minister, Sri V. N. Sukthankar, Governor of Orissa, Dr. H. K. Mahtab, Chief Minister, Orissa and Dr. R. P. Misra, Health Minister, Orissa. The conference was well attended.

WELCOME ADDRESS

Dr. S. C. Das, Chairman Reception Committee accorded a hearty welcome to the guests and members. In his speech he said, "Signicant progress has to be made in the overall health position of the country. But in this State in particular, whose 2/3rds of total population constitute backward classes, the health status is still the lowest in India. It is hoped this Conference will draw up their recommendations for health schemes during the Third Five year Plan. It is hoped that the Conference will also deliberate for eradication of small-pox and see how far the Indian Medical Association can help in the matter. The ways and means of complete eradication is well-known. Application of accepted methods is all that is wanted.

There is always a clamour, reasonable clamour that millions in our villages do not get a doctor at hand for medical aid and whereas fact remains that in large towns all our doctors cannot earn a reasonable living due to overcrowding. This is a problem which cannot be settled by emotional appeals. We have got to face the practical difficulties. I hope this Conference will chalk out a definite recommendation in this respect.

There is another aspect of health work in which I feel initiative can be taken by the profession. I mean forming of co-operative health societies and group practice etc. A complaint commonly heard against the scientific practice of modern medicine is its expensive nature. The placing of medical aid facilities by practitioners in a cooperative basis particularly on an easy prepayment system seems to offer the answer to such criticism. This Conference will I hope, give a guidance in this respect."

INAUGURAL ADDRESS

In augurating the conference Dr. R. P. Misra, Health Minister, Orissa said, "The general practitioners who are members of the I.M.A. can lead 'Health Missions' to the rural areas imparting appropriate education to the people regarding environmental hygiene, sanitary condition and making them health conscious. They can also advise the people regarding prevention of diseases, carry on health propaganda to throw out social stigma attached to diseases like Leprosy and T.B., establishing a faith in the minds of the people that they are not incurable diseases. They may also study the social condition, undertake survey of diseases, organise Child and Maternity Welfare Services and School Health Services."

Dr. A. B. Roy, Minister of Health, West Bengal was the chief guest. He discussed the medical problems of the present time and offered suggestions for improving the position.

PRESIDENTIAL ADDRESS

Dr. D. R. N. Sahu in his presidential address said that :

"I stand before you to share my thoughts with you regarding the various problems that we are faced with. The Indian Medical Association is our National Medical Organisation and our goal is the achievement of National Health. Though we have 1,447 registered medical practitioners in Orissa our membership strength of Indian

DR. R. P. MISRA
HEALTH MINISTER, ORISSA
INAUGURATED THE CONFERENCE

DR. D. R. N. SAHU
PRESIDENT OF THE
CONFERENCE

DR. S. C. DAS
CHAIRMAN, RECEPTION COMMITTEE OF THE CONFERENCE

Medical Association is only 358. This number will be slightly higher during the current year as we have recently started two branches. If we have to achieve our goal it is necessary that every registered medical practitioner should join Indian Medical Association and strive to help towards the achievement of our goal. In order to achieve our goal it is necessary for us to keep in view the four objectives that were placed before Government by Indian Medical Association before the Second Plan was finalised, namely :

(1) Prevention of illness.
(2) Rendering scientific relief irrespective of individual financial resources.
(3) Undertaking measures for achieving positive health.
(4) Spread of Medical Education and Medical Research.

The number of members can be double within a very short period if each individual member sets himself to the task seriously to recruit another. I would request the members of Indian Medical Association present here to take up this matter very seriously and see that our membership is doubled within the shortest period.

MEDICAL EDUCATION :

Our various development schemes have been held up for want of medical and para-medical personnel. We are short of doctors, nurses, health inspectors and pharmacists and so on. I personally feel that serious thoughts have not been given to the problems of Medical Education in our country.

Various changes in medical curricula are proposed and are given effect to with the object of producing more medical graduates within a short period. The result being that quality is being sacrificed for quantity.

Methods of teaching have to be modified and greater emphasis should be laid on child health and preventive medicines. If we have to produce better men and women the common hazards in early life has to be guarded against. If a child is properly protected many diseases in adult life can be prevented. Medical care does not imply only prescribing the remedy for a particular malady. It implies all steps that are necessary to promote positive health in the community. If Medical teaching is not imparted on these lines it will not be possible for young graduates to function properly as medical officers in National Extension Service and Community Projects in-charge of Primary Health Centres.

The teachers in the Medical Colleges should be able to devote considerable time to their teaching duties as also to research work. This, they are not able to do at present because they are allowed private practice as such they are not functioning as whole time teachers. In this context it will not be out of place to recall the resolution No. 16 passed at the XXXVI All India Medical Conference at Indore in December, 1959 which reads as follows : *Resolved that in all Medical Colleges, private practice of all teaching staff be banned and they may be given an additional remuneration as laid down by the Indian Medical Association.*

The Director of Health Services is so occupied with his routine administrative duties and various development schemes that he finds no time to devote to planning of medical education and research. He should be assisted by a Joint Director of Health (Medical Education), whose duties will be confined to the planning of Medical Education and Research as also training of various health personnel. He should be a person with high post-graduate qualification and teaching experience in a medical college for few years.

Modern scientific medicine is often erroneously called alopathic system of medicine. Alopathic system of medicine flourished in Europe and was based on the principle of *"Contraria Contrariibus Curanter"*. "Ayurveda is a system of medicine practised in Ancient India and is based on the principle of *Tridosha theory"*. Homeopathy had its birth in Germany and is based on the principle of *"Similia Similibus Curanter"*. I do not intend to say that any of these is unscientific. The modern scientific medicine accepts anything that can be scientifically proved to be true and beneficial. Hence there should not be any conflict between modern scientific medicine and any other ancient system of medicine. A few years ago a synthesis was sought to be brought about between ayurveda and modern medicine which gave birth to the integrated system. Many indigenous medical herbs are known to Ayurveda. The best contribution of Ayurveda to modern medicine would be to carry out research in these drugs and standardise them for use in modern medicine. Rauwolfia Serpentina (*Sarpagandha*) or *"Patala Garuda"* is a bright example of this. This drug has been accepted to-day as a wonder drug all over the world.

Orissa is a poor province and unfortunately we have many health problems which if not solved adequately and quickly is likely to make us poorer still. We have disease like Malaria, Tuberculosis, Leprosy and Filaria which has been depleting our man power very severely. We have in our State altogether 264 beds for tuberculosis patients and it will not be wrong to say that at least a lakh and half of persons are suffering from tuberculosis in various parts of the State. The problem of tuberculosis can not be solved by merely more hospital beds. For this it is necessary to set up T.B. Clinics in every district and possibly in every sub-divisional hospital.

Domiciliary treatment of leprosy is being carried out in various parts of the State and it is necessary to do this more intensively so as to be able to eradicate this disease within a few years.

Efforts of the Government for malaria control and eradication have been fairly successful all over the State. The incidence of Malaria has gone down considerably. I am told, it is difficult these days to demonstrate malaria parasite to the students in the medical college in the blood of a patient.

Prevention of diseases is certainly the responsibility of the State but it must be realised that to make the various preventive measures effective, full co-operation of the community is essential. Mosquito larvae can be destroyed be certain varieties of larvaecidal fish. In the Philippines much of antilarval work is done with a variety of larvaecidal fish called "Tilapia". Research in this direction is necessary particularly to deal with the extensive paddy fields we have in our country.

It is most unfortunate that some time back some statements appeared in the press to show that small-pox vaccination causes leprosy, cancer, tuberculosis etc. This is bound to make vaccination unpopular. I would request all the members of the Indian Medical Association to make it a point to remove fears and doubts of people that might have cropped up as a result of such propaganda.

We have at present in our State 1,447 registered Medical Practitioners of which almost half the number are medical graduates. The fact that medical graduates are generally not inclined to enter into the State Service goes to show that the service conditions are not attractive. The scale of pay for the Assistant Surgeons is Rs. 195 to Rs. 460. Considering the present cost of living, the scale is obviously not attractive for a graduate, who spends 5½ years after his I.Sc. qualify himself. Previously the best students of the universities used to seek admission into the medical colleges and the best of the group were selected. Experience during the last few years shows that the best students do not seek admission into the medical colleges and they prefer Technical Colleges. These facts deserve very close investigation to find remedies so as to make medical career attractive to young men and women.

TRAINING OF PARA-MEDICAL PERSONNEL :

We have various training programmes for pharmacists, health inspectors, nurses, auxiliary nurses, midwives and so on. Inspite of facilities for the various training programmes it is a matter of common experience that adequate number of candidates do not come up for this training. This applies particularly to candidates for the nursing profession. A candidate is eligible for admission into the nursing training class who has the minimum educational qualification upto Class VIII of High School standard and who is not below 17 years of age. A girl reaches the standard VIII by the time she is about 13 to 14 years old. She cannot possibly wait till she attains the age of 17 for the nurses training. After passing matriculation she does not like to enter the nursing profession because the pay scale is rather low. The Nursing Council of India lay down the minimum educational qualification for the training in nursing as matriculation. This has been relaxed to class VIII in our State because of the fact matriculates do not wish to enter the nursing profession. It is highly desirable that the candidate recruited for the nursing training should be matriculates. It is equally desirable that the pay scale should be revised to attract the right type of persons for this profession.

The 4th grade servants employed in the hospitals, such as ambulance strecher bearers, ward-attendants, sweepers need certain amount of training so that they can function properly and take up their places in the treating team which is captained by the doctor. I feel that some training programme should be chalked out for this class of para-medical personnel so that they may discharge their duties scientifically.

My last thought that I wish to leave with you for your consideration is that in our attempt for the general development of our country let us not forget our army of medical and para-medical personnel that are fighting hard not only to prevent and cure diseases but to promote positive health in the country. So proper remuneration should be arranged for them.

* * * *

At the close of the inaugural session on the 16th, Dr. G. C. Pattanaik, President, Bhubaneswar Branch, I.M.A. proposed a vote of thanks to the distinguished guests and members. Dr. H. K. Mahtab, Chief Minister, Orissa entertained the guests and members in a State Dinner in the State Guest House at 9-0 P.M. After the dinner a documentary film on 'Artificial Kidney' was shown.

On the 17th April there was a scientific session in which the problem of incidence of Cancer in Orissa was discussed. Dr. N. Pradhan, Dr. R. P. Misra, Health Minister Orissa, Dr. A. P. Sinha, Dr. G. B. Mohanty, Dr. R. Mahanti and Dr. G. S. Mahapatra took active parts in the discussion. In the afternoon the Open Session of the Conference was held and various problems concerning the profession and health problems of Orissa were discussed and the following resolution was passed.

'The 12th Orissa State Medical Conference adopts all the resolutions from No. 1-18 which were passed in the 36th session of the All-India Medical Conference held at Indore in 1959'.

BRANCH NOTES

CHIKMAGALUR BRANCH—A meeting was held on 26-6-60. Dr. B. S. Ventakaraman Setty presided. About 30 members were present. The president introduced the guest speaker Dr. S. V. Govindasetty of Victoria Hospital, Bangalore. Dr. Govindasetty spoke on Diabetes.

DEHRI - DALMIANAGAR - SASARAM BRANCH—A meeting was held on 29-5-60. The secretary announced the receipt of prize bonds of Rs. 100/- from Dr. D. Sanyal who had requested that the prize from the bonds should be utilised for the building fund of the branch. The donation of Rs. 25/- in prize bond by the same donor for the benefit of the Central building fund was also announced. Dr. Pathak told the house about the steps taken to raise money for the building fund.

The president welcomed Dr. A. K. N. Sinha and Dr. P. N. Sinha, M.L.C. of Patna and Dr. C. Prasad of Arrah. Dr. A. K. N. Sinha was requested to speak on Myocardial Infarction. Dr. Sinha gave an illuminating talk followed by a lively discussion.

Dr. D. Sanyal entertained the members to dinner.

DIBRUGARH BRANCH—A special meeting was held on 30-6-60 under the chairmanship of Dr. S. N. Sarma, to condole the sad death of Dr. L. K. Barooah of Nowgong. Almost all doctors of Dibrugarh attended. A resolution expressing deep and heartfelt sorrow at the sad event was passed and a copy of the resolution, it was further decided, was to be sent to the bereaved family.

EAST GODAVARI DISTRICT BRANCH—The year started in October 1959 with the following office-bearers : Dr. P. N. Rao—president; Drs. B. Venkata Raju, P. V. N. Raju and N. Ammanapantulu—vice-presidents; Dr. P. Shivaramakrishna Rao—hony. secretary; Dr. H. Sumitra Rao—treasurer and joint secretary. A short account of the meetings held since is given below :

15-10-59. Dr. Jaffari, spoke on Challenge of Treponema to Science. Dr. P. V. Raju was in the chair.

14-11-59. Dr. Varma spoke on Suppurative Arthritis of the Hip in Infancy and Childhood. Cases of Pseudopancreatic Cyst and Intratemporal Bilateral Haemangioma by Dr. P. V. N. Raju and Lupus Vulgaris by Dr. N. Ammanapantulu were demonstrated. Dr. P. N. Rao was in the chair.

29-11-59. Dr. V. Govindan Nair spoke on Current Status of Syphilis. Dr. Mallikarjuna Rao demonstrated a case of Congenital Syphilis. Dr. P. N. Rao presided.

31-1-60. Dr. D. Govinda Reddy spoke on Modern Trends in Atherosclerosis and Coronary Disease. Dr. P. N. Rao was in the chair.

24-2-60. Dr. T. S. R. Murthy gave a talk on Club Foot illustrated with lantern slides. A documentary film on A Trial Septal Defect and Judet Arthoplasty was shown. Dr. P. N. Rao presided.

26-2-60. The members met Dr. L. Iverson, in-charge, Geographic and Infectious Diseases, A.F.I.P. (U.S.A.). Dr. Iverson spoke on Geographic Pathology.

23-4-60. Dr. P. S. Giri, president of Andhra State branch gave a talk on the Unity of the Medical Profession and Association to Combat Quackery. Dr. M. Krishnamurty spoke on Acute Abdomen.

4-6-60. Dr. P. V. N. Raju spoke on Infections of the Hand. The following were demonstrated : 4 cases of Psorinasis by Dr. Ammanapantulu; one case of Tricuspid Regurgitation by Dr. Shivaramakrishna Rao; one case of Perinephric Serosanguinous Cyst by Dr. P. V. N. Raju. Dr. P. N. Rao was in the chair.

KANPUR BRANCH—On the occasion of the annual day a regional conference was held on 5-6 March 1960.

At the scientific session on 5-3-60 the following papers were read.

Chronic Bronchitis by Dr. K. N. Gour, Recent Advances in Treatment and Management of Burns by Dr. Pritam Das, Recent Trends in the Management of Hypertension by Dr. S. C. Jain. This was followed by Tea and a film show.

On 6-3-60 Dr. Bhola Nath, president of U. P. State branch hoisted the Association flag. The open session of the conference was inaugurated by Dr. H. N. Shivapuri, president of the I.M.A. The following papers were read : British National Medical Health Service by Dr. A. L. Banks, Some Problems of Tuberculosis by Dr. R. N. Tandon, Recent Trends in Social and Preventive Medicine by Dr. B. G. Prasad.

The celebrations were rounded off by a dinner. Dr. Shivapuri replied to the toasts.

MEMBERS ATTENDING THE REGIONAL CONFERENCE OF THE KANPUR BRANCH I.M.A., HELD ON MARCH 5—6, 1960 AT KANPUR

KARIMNAGAR BRANCH—The monthly meeting of the branch was held on 12-5-60. Dr. Gulam Nabi presided. Films were shown on Resuscitation of a Failing Heart, Syphilis, Moniliasis, Surgery in Tuberculosis, etc. The members discussed the clinical features of the above.

K. G. F. BRANCH—A meeting was held on 24-6-60. Dr. R. Wats presided, 17 members were present. The following cases were presented. Tumour Breast by Dr. G. V. Venkata Setty; Tumour in the Left Side of the Chest in a Man by Dr. C. Rajasekar; A Mass in the Right Iliac Fossa by Dr. R. Wats.

MADURA BRANCH—A meeting was held on 25-6-60 under the presidency of Dr. E. S. Chellappa. Dr. Balagopal Raju of Madras gave a talk on Some Common Paediatric Medical Emergencies.

MONGHYR BRANCH—An ordinary meeting of the branch was held on 29-5-60. Dr. P. K. Mitra presided. A sub-committee was formed to deliberate on (a) Construction of a new association building, (b) desirability of sale of the present hall to raise funds for construction of a new building, (c) Construction of parapet of the old building. Dr. B. P. Jamuar, Health Education Officer, Bihar gave a lecture on Medical Education. Shri P. K. Roy spoke on Education and Training of mentally deficient children.

An emergent meeting was held on 5-6-60 to condole the death of Dr. Gouranga Prasad Chatterjee at the age of 87 years. Late Dr. Chatterjee was a life member of I.M.A., Monghyr branch. He was very popular and was highly respected for his charitable disposition and professional abilities. It was decided to send a copy of the resolution to the members of the bereaved family.

M. P. STATE BRANCH—The provincial council met at Bhopal on 24-4-60. Dr. G. S. Wagle, president, was in the chair. Twenty-eight members were present. At the outset one minute's silence was observed as a mark of respect to 8 members who had recently died. The president read his tour report. He said the amount sanctioned for his tour was too meagre and should be increased. The constitution drawn up by the sub-committee was discussed and finalised to be put up before the next meeting of the council. On a resolution put up by the Jabalpur branch the M. P. Government was requested to consult the I.M.A. for nomination of I.M.A. representative on the Divisional Medical Board. A sub-committee was formed to go into the working of the M. P. Medical Council. Another sub-committee was formed to go into the working of the M. P. Medical Council. Another sub-committee was formed to go into the details of the working of the E. S. I. scheme.

The state secretary informed the house that recommendations regarding pay scales of government doctors have been forwarded to the authorities. A suggestion was made for the formation of a Telephone Advisory Committee. The Bhopal branch was At Home to the members of the Council.

MUZAFFARPUR BRANCH—The branch has started a family planning centre from 6-6-60 at the Child and Maternity Welfare Centre, Muzaffarpur. It is open to the public on Mondays and Saturdays between 5 and 6 P.M. Advice and contraceptives are given free to those who attend the centre.

NAIHATI BRANCH—A meeting of the branch was held on 27-4-60 with Dr. (Capt.) A. Sen in the chair. Regarding the E.S.I. Scheme, the following difficulties were pointed out and it was decided to send a deputation to the authorities concerned on the following; (a) the scheduled space of 200 sq. ft. for a E.S.I. doctors' clinic be relaxed, (b) Maintenance of a list of instruments will be made only when the doctor is placed in the approved list, (c) Medical Officers of the Mills are not authorised to maintain a clinic outside. Unless these doctors are given permanent appointments, this matter requires consideration.

NELLORE BRANCH—A meeting of the branch was held on 7-5-60. Dr. J. Prakasa Rao presided. Dr. Y. Rama Chandra Reddy, Professor of Paediatrics, Guntur Medical College, gave a lecture on Paediatric Emergencies in General Practice.

PALGHAT BRANCH—On 29-5-60 a committee meeting was followed by a clinical meeting when cases were presented by Drs. A. G. Menon, V. K. Balagangadharan, P. Sankaran Nair and K. Alikutty, Dr. K. Madhava Nair presiding over both the meetings.

On 12-6-60 Dr. C. Balakrishnan gave a talk on Plastic Repair of Congenital Defects. The talk was illustrated with lantern slides. Lt. Col. G. S. Parasuram, president, was in the chair.

NOTES AND NEWS

African Good-Will Trip

A group of Canadians under the auspices of the Canadian Supporting Committee of The World Medical Association are undertaking an extensive tour of Africa. Among their numerous purposes are: To talk to medical men discussing common problems and interests trying to understand their problems and help them see those of the Canadian doctors; and to create and cultivate good-will and understanding with newly formed countries such as Ghana, Nigeria, Congo and others.

International Congress on Nutrition

The Fifth International Congress on Nutrition will meet at the Sheraton Park and Shoreham Hotels in Washington, D.C., September 1 to 7, 1960. Beginning in 1946, former Congresses have been held in England, Switzerland, the Netherlands, and France. This will be the first time one has been held in the United States.

An all-day symposium on 'World Food Needs and Food Resources' will be one of the main features of the scientific programme. The remainder will consist of seven half-day discussions by invited participants, and special sessions at which 370 ten-minute papers reporting unpublished original research will be presented. Further information may be available from the Director of Public Information, Mr. Sidney S. Negus, Medical College of Virginia, Richmond, U.S.A.

Refresher Course for General Practitioners

For the first time, the authorities of the Christian Medical College and Hospital, Vellore, will conduct a Refresher Course for General Practitioners in connection with the Jubilee Celebrations (Diamond Jubilee of the Hospital and Golden Jubilee of the School of Nursing). The course will commence on August 8, 1960 and will last for 5½ days. Many eminent medical men from outside and from the college will conduct the course. The following subjects will be discussed:

August 8, 1960: 1. Chronic Urinary Infection—A Challenge: Dr. Bhat; 2. Indications for Surgery in Cardiovascular Diseases: Dr. Thomas; 3. Hypertension —Medical Management: Dr. Vytilingam; 4. Menopausal and Post-menopausal Bleeding: Dr. Manuel; 5. Simple Diagnostic Approach to Anaemias: Dr. Baker; 6. The Contribution of General Practitioners to Medical Care in India: Dr. Kutumbiah.

August 9, 1960: 1. Hand Infection: Dr. Anderson; 2. The Management of Burns: Dr. Joseph; 3. The Discharging Ear: Dr. Patt; 4. Common External Eye Conditions: Dr. Ebenezer; 5. Early Recognition of Intracranial Space-occupying Lesions: Dr. Chandy; 6. Ischaemic Heart Disease: Dr. Anklesaria; 7. Management of Congestive Heart Failure: Dr. Gordon.

August 10, 1960: 1. Leucorrhoea: Dr. Paranjothi; 2. Planned Parenthood: Dr. Manuel and Dr. Bhat; 3. Problems of the New-born: Asphyxia, Jaundice, Infections and Feeding: Dr. Webb; 4. Acute Respiratory Infections in Infants and Young Children: Dr. Webb; Tuberculosis: (a) Pulmonary aspect: Dr. Gopinath; (b) Genito-Urinary aspect: Dr. Bhat; (c) Orthopaedic aspect: Dr. Rockwell; (d) Paediatric aspect: Dr. Webb.

August 11, 1960: Management in Private Practice: (1) The Diabetic: Dr. Koshy; (2) Common Dermatoses: Dr. Gass; (3) Convulsive Disorders: Dr. Klontz; (4) Uses and Abuses—Antibiotics, Hormones, Steroids: Drs. Gault (Moderator), P. Koshy, T. S. Koshy, David, Penn, Paranjothi, and Jadhav; (5) Anaesthesia in General Practice: Dr. Lewis; (b) Common Fractures of Extremities: Dr. Rockwell; 7. Surgical Clinical Conference.

August 12, 1960: 1. Hazards of Radiation: Dr. Johnson; Helpful Hints for General Practitioner Laboratories: Dr. Chappel; 3. Immunisation—Present Possibilities: Dr. Webb; 4. The Management of Diarrhoea in Infants and Young Children: Dr. Webb; 5. The Jaundiced Patient: Dr. Narielvala; 6. Labour—Abnormal Uterine Action: Dr. Kunders and Dr. Balasundaram; 7. Medical Clinical Conference; 8. Low Back Pain: Dr. Natarajan.

August 13, 1960: 1. Surgical Abdominal Emergencies —Obstructive: Dr. Penn; 2. Surgical Abdominal Emergencies—Non-obstructive: Dr. Joseph; 3. New Concepts in Management of Leprosy: Dr. Gass and Dr. Anderson; 4. Psychiatry in General Practice: Dr. Kohlmeyer; 5. Retention of Urine: Dr. Venugopal.

Effects of Caffeine on Brain

If one takes a cup of coffee at 7 in the morning one may not get much additional stimulation from another cup until after 10 o'clock.

This is one of the deductions made from experiments on the effects of caffeine on the brain collected by a Calcutta scientist, Dr. Ajit K. Maiti, during research in collaboration with an American expert at Ann Arbor, Michigan, U.S.A., according to information available in Calcutta. They are believed to be the first scientists to study the neurological effects of coffee.

Dr. Maiti, a former lecturer of Calcutta University, is now a post-doctoral fellow of Michigan University, investigating brain stimulants with Dr. F. Domino, associate professor of pharmacology at the University. His two-year work is being sponsored by the U.S. National Academy of Sciences.

The two researchers found coffee to be quick-stimulating while giving temporary immunisation against further stimulation. The caffeine content of one cup of coffee is said to give peak stimulation in 20 minutes, a condition which continues for about 2½ hours, ending quickly thereafter. But the first cup is also said to partially block the effects of a second cup during this period, a process known to science as tachyphylaxis. There are said to be large individual variations in this time-table.

Malaria Eradication Programme

An agreement was signed on June 30, 1960 at New Delhi between the Government of India and the United States Technical Co-operation Mission for further aid to India's malaria eradication programme.

As a result of this agreement, says an Official Press Release, a sum of about Rs. 40 lakhs was made avail-

Allergic to fruit?

AVIL relieves symptoms of incessant itching due to food allergy. It is prompt in action and has prolonged effect. AVIL is potent, well-tolerated and is virtually free from side effects.

AVIL® for allergy

Tablets **Ampoules** **Ointment**

HOECHST PHARMACEUTICALS
PRIVATE LIMITED
Bombay · Calcutta · Madras · New Delhi

HOECHST AG

HPA. 30-33

new Savlon

For the prevention and treatment of infections of the mouth and throat.

Saliva tests prove that 'Savlon' Lozenges are more active in the mouth than other antiseptic lozenges. When 'Savlon' Lozenges are sucked at 2-hourly intervals the oral streptococcal counts show a one-hundred-fold reduction.

'Savlon' Lozenges each contain (5 mg.) 'Hibitane' (Chlorhexidine Dihydrochloride) with (2 mg.) Benzocaine B.P.— sufficient to ease pain without interfering with the swallowing reflex or hindering healing.

antiseptic lozenges

containing 'Hibitane' the new I.C.I. antiseptic

Noteworthy Characteristics

Powerful antibacterial effect; safe; bacterial resistance cannot be induced; pleasantly flavoured and well liked by children.

Made and distributed in India by **Imperial Chemical Industries (India) Private Ltd.**
Calcutta Bombay Madras New Delhi

BLC-4

able, out of which Rs. 34·3 lakhs will be spent on acquiring from abroad stocks of DDT. The rest of the funds will be utilised for the import of anti-malaria drugs and laboratory equipment.

Burmese Campaign Against Leprosy

Burma is carrying on a vigorous campaign against the rising incidence of leprosy in the country. With a populaion of 20 million, the country has 200,000 lepers of whom nearly 30 per cent suffer from the infectious type, according to official sources.

The most alarming feature was that about 18 per cent of the children in the country were already afflicted with the disease. The rate of increase had been found to be fastest in the Shan States and some dry zones.

The Government in its drive against the disease is being assisted by WHO and UNICEF. Last year about 55,000 patients were treated and the target set for this year is 60,000.

Three Regional Hospitals for Coal Miners

Construction of three regional hospitals for coal miners near Salanpur, Bejdi and Neturia has been recommended by the West Bengal Coalfield Committee. The decision was taken at a meeting held recently. They are estimated to cost Rs. 7 lakhs each. Initially each will have equipment worth Rs. 12 lakhs. It is stated that the department has sufficient funds to take up construction work. The meeting also decided to offer 19 scholarships to children of miners in the Asansol area for technical education.

Expensive Drugs at Cost Price

The Orissa Government has decided to open fair price shops for life-saving drugs in the rural areas. These shops, which will be attached to village hospitals, will supply expensive medicines to patients at cost price.

The decision was taken by the Government following a general complaint that costly life-saving medicines were beyond the reach of poor people in the rural areas.

Synthetic Drugs Factory

Mr. D. Sanjivayya, Chief Minister, told Mr. D. V. Subba Sastry at question-hour on June 25, in the Andhra Pradesh Legislative Council that the Government of India had decided to set up a synthetic drugs factory near Hyderabad, at a cost of Rs. eight crores as early as possible.

Production of Chlorophyll

Two German chemists have discovered the way to produce chlorophyll by a synthetic process, the General Chemical Industry Union announced recently.

Chlorophyll is the mysterious substance which makes plants green. Its essence holds many biochemical secrets. Scientists have been seeking for decades to produce it artificially.

The two chemists made the discovery after 20 years of research. The discovery was 'a great new achievement for chemistry' and of 'inestimable signifiance for mankind'.

Union Ministry's Stipend Scheme for Public Health Engineers

The Union Ministry of Health has decided to give financial assistance in the form of stipends, fees and other expenses to 340 Public Health Engineers and auxiliary Public Health Engineering personnel studying courses which began on or after April 1 this year.

An official Press release says thirty engineers under training for the M.E. (Pb) degree at the All-India Institute of Hygiene and Public Health, Calcutta, and ten engineers for the M.Sc. degree in Public Health Engineering at the Engineering College, Guindy, Madras, will be given stipends of Rs. 150 per month each for a period of ten months.

Stipends have been sanctioned for not more than ninety engineers for the 3-months courses at the Engineering Colleges at Roorkee and Guindy at the rate of Rs. 150 per month per trainee.

For the engineering subordinate courses at the All-India Institute of Hygiene and Public Health, Calcutta, and at the Engineering Colleges at Roorkee and Guindy, 120 trainees will get stipends of Rs. 100 per month each.

Stipends will be given to not more than sixty water works operators to be trained in short courses of about a month at the regional centres. The value of the stipend per trainee will be Rs. 100 per month.

Thirty stipends of Rs. 75 per month per trainee have been sanctioned for sanitary inspectors to be trained in a short course to be organised at a suitable centre.

Candidates sponsored by the State Governments, Municipal Corporations, Improvement Trusts, local bodies and approved by the Ministry of Health, are eligible for the assistance.

The stipends will, in all cases, be given to candidates in addition to the normal pay and allowances drawn by them from their States.

Madras Medical Council

On a complaint received from the Madura Mills Co. Ltd., Madurai, that Dr. A. D. Victor, L.M.P. (MAD.) 1921, 21 Vaduka Kavalkuda Street, Madurai, had issued a false medical certificate to one Sri Subbiah, sweeper, Pandyan Mills, the Madras Medical Council held an enquiry on 21st March 1960, and found him guilty of infamous conduct in a professional respect and in exercise of the powers conferred on it by section 16(2) of the Madras Medical Registration Act 1914 (Act IV of 1914), the Madras Medical Council directed that the name of Dr. Victor Pillai Athisayam Devadoss, L.M.P. (MADRAS) 1921 holder of Registration Certificate No. 2448 be erased for a period of six months.

Free Mid-day Meals Scheme for School Children in Andhra

The Government of Andhra Pradesh have sanctioned Rs. 3 lakhs for the implementation of the scheme for providing free mid-day meals to children in select schools in the 254 Samithi Blocks of the State during the year 1960-61.

In communicating their sanction, the Government have pointed out that the supply of free mid-day meals to poor children would be an effective incentive to attract children to the school and would go a long way in the successful implementation of the scheme of universal free and compulsory primary education for all children in the age group 6-11 years during the Third Five-Year Plan period.

Tuberculosis Institute in Hyderabad

Mr. K. V. Ranga Reddy, Deputy Chief Minister of Andhra Pradesh, inaugurated in Hyderabad the Institute of Tuberculosis and Diseases of the Chest on May 25. Mr. P. V. G. Raju, Minister for Health and Medical Services, presided over the function.

Major K. N. Rao, Director of Medical Services, welcoming the Ministers said that there were about two and half million infective tuberculosis cases in the country. Reviewing the anti-T.B. measures taken in the State, Major Rao said that at the time of the formation of the Andhra State, there was practically no anti-T.B. programme. About 25 T.B. clinics were established in the State during the past four years. It had been proposed to establish seven more clinics during 1960-61.

The Government of Andhra Pradesh, Major Rao said, had sanctioned the establishment of a rehabilitation centre at Rafat Bagh associated with the T.B. Sanatorium in Vicarabad. It had also been proposed to establish a rehabilitation centre, in the T.B. Hospital in Mangalagiri, Nellore and Eluru. Major Rao said that thoracic surgery centres had been established in King George Hospital, Visakhapatnam, Osmania General Hospital and T.B. Hospital, Irrumnumma, for the surgical treatment of pulmonary T.B. He also added that a scheme for the establishment of similar centres in Guntur and Kurnool was santioned by the Government. He further said that the Government had decided to take T.B. control measures in the Community Development Blocks. As an experimental measure, the Government wanted to establish four community development blocks.

Raman's Technique for Viewing One's Own Retina

Dr. C. V. Raman, famous physicist, has recently developed a new technique by which, without the aid of any instruments whatever, it is possible for a person to view his own retina in action and observe how its different parts function in the perception of colour.

Dr. Raman announced this discovery in a talk in the National Programme on perception of colour broadcast over All-India Radio recently.

Describing the new technique, Dr. Raman said: "The observer sits facing a white screen in a well-lighted room and views the screen through one or another of a suitably chosen set of colour filters held close to the eyes. After allowing a sufficient time for the observer's vision to adapt itself to the effect of the colour filter, the latter is suddenly removed.

"The observer then sees on the screen a highly enlarged image of his own retina, or rather of the physiologically important central part of it, known as the macula lutea. The nature of the image perceived and the colour which it exhibits in different parts depends very much on the colour filter used.

The new technique, Dr. Raman said, had disclosed the existence in the human retina of three different pigments which he named visual pigments. These enable people to perceive the full spectrum of colour extending from extreme violet to extreme red.

After discussing the question of limen or minimum of colour difference which the eye could detect along the spectrum, Dr. Raman inferred that the perception of light and colour involved a simple transference of the energy absorbed by the visual pigment to the neurons in the retina.

Manufacture of Water Dispersible DDT

The National Chemical Laboratory, Poona, has developed a simple process for the preparation of water dispersible DDT for insect control purposes.

DDT crystals are ordinarily, soft and sticky and cannot be easily reduced by simple grinding. The important requirements of water dispersible DDT are high suspensibility in water, sufficient covering power, ready availability on the surface, quick delivery of the lethal dose and high residual toxicity.

This type of DDT has been prepared in the form of an oilbound paste which facilitates the transfer of the insecticide into the body of the insect coming into contact with it.

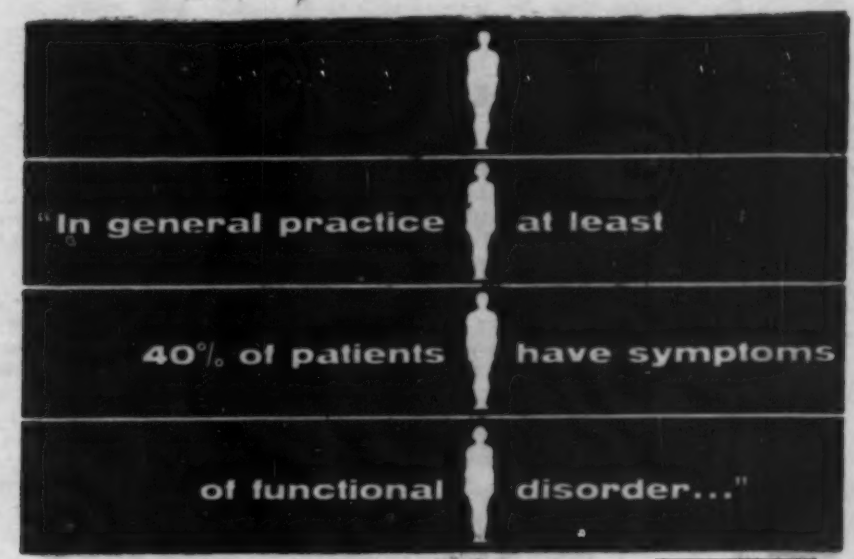
The manufacturing process is easy and simple and has been tried on semi-pilot plant scale producing 250-300 pounds per day.

Parties desirous of taking up the commercial development of the process are invited to correspond with the Secretary, National Research Development Corporation of India, Mandi House, Lytton Road, New Delhi.

REVIEWS

Medical Terminology for Radiographers—Paul M. Davies, M.B.B.S., D.P.H., F.F.R., D.M.R. 1960; William Heinemann Medical Books Ltd., London; 7½" x 5"; pp. 242; price 15s. net.

The author has explained in a concise and simple manner most of the medical terms used to express anomalies, pathological conditions and diseases.



Lancet (1958) 1,325

Bellergal Retard

BY **SANDOZ**

in functional disorders

1 tablet night and morning
for continuous control of symptoms

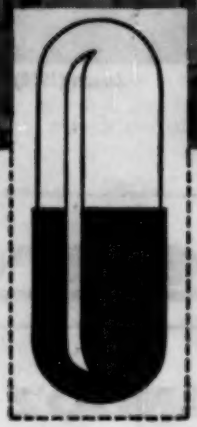
Sandoz Products Private Limited

Bombay P.O. Box 1540
Calcutta P.O. Box 491
Madras P.O. Box 1725
New Delhi P.O. Box 322

0.2 mg. total alkaloids of belladonna
0.6 mg. Ergotamine Tartrate B.P.
40 mg. Phenobarbitone B.P.

SZ. 6004

A CAPSULE A DAY



Suffices in the majority of conditions

Therapeutic formulation for intensive therapy

For water-soluble vitamins:

BECOSULES

a balanced formula of Becomplex vitamins with C in therapeutic dosage

For multivitamin therapy: **MULTIVITAPLEX FORTE**

Also available to meet individual needs:

Multivitaplex Tablets—Becomplex Tablets and Inj.—Vit. A+D Pills and Oil—Calcium+Vit. D Tablets—Vit. A Inj.—Vit. B_1 Inj. and Tablets—Vit. B_{12} Inj. and Tablets—B_{12} Forte Inj.—Vit. C Inj. and Tablets—Vit. D Inj.—Vit. E Inj.—Vit. K Inj.—Hepar-12 Inj.

CONCENTRATED • POTENT • BALANCED

DUMEX

DUMEX PRIVATE LIMITED
ICICI Building,
163, Backbay Reclamation,
Bombay 1

To radiographers and laboratory technicians having minimum basic knowledge of human anatomy and physiology, the book will impart working knowledge of various pathological processes and will undoubtedly improve their efficiency. This in itself will create better understanding between doctors and technicians.

In the reviewer's opinion this book will be of great help to working as well as student technicians.

B. K. DEY

Pediatric Dermatology—Henry H. Perlman. 1960; Year Book Publisher, Inc., Chicago; 10" × 7"; pp. xii plus 477; price $18.00.

In this book the author has discussed the aetiology, clinical picture, diagnosis and treatment of various cutaneous manifestations especially in children, with beautiful illustrations. The preliminary chapters, viz., principles of dermotherapeutic management, the remedial agents, formulary, are instructive and useful. The chapter on formulary has been written in detail. The book consisting of 30 chapters in all is of 461 pages with an index and will be useful to dermatologists, paediatricians and general practitioners.

The paper, printing and binding are excellent.

A. N. CHAKRABORTY

A Doctor's Approach to Industrial Medicine. 1960; Tata Institute of Social Sciences, Publication Dept., Chembur, Bombay 71; 8⅛" × 5⅛"; pp. 151; price Rs. 6·50.

"A Doctor's Approach to Industrial Medicine" is not a comprehensive book on Industrial Medicine but it is a collection of 16 articles drawn from varied writings and lectures of Dr. H. P. Dastur. Truly speaking none of these articles can be considered to be straightforward scientific treatise on Industrial Medicine. Each one of them expresses a philosophical thought on the various problems affecting the wellbeing of the industrial workers. They are more or less the production of a philosopher rather than of a scientist.

Dr. Dastur's connection with industrial medicine is very long. He joined Tata Industries as Medical Officer of Tata Hydro-Electric in 1910, just after his return from England. Being a religious man himself, the hard life of the industrial workers in this country at the time appealed to him. He saw the good work the Industrial Medicine was doing in England and abroad and was naturally tempted to try it in India for the betterment of the industrial workers. His approach to industrial medicine therefore, was more as a philanthropist rather than a scientist.

He was a pioneer in India as far as the practice of industrial medicine was concerned. And like all pioneers he became completely engrossed in his work. Whatever he thought would do good to the workers, he tried to bring it under the purview of industrial medicine.

Dr. Dastur in his article—"Industrial Medicine: its Religious Aspect"—describes the 65,000 textile workers of Ahmedabad prior to the formation of their Union under the guidance of Mahatma Gandhi, as a "rotting mass of humblest and most depressed humanity". He saw Mahatma picked this vegetating mass of humanity and woke them up into action by placing before them a religious ideal to live and die for. This little bit of spiritual idealism did more in course of a few years than all the branches of industrial medicine could do in course of a century. He at once unhesitatingly includes religious teaching in the industrial medicine and says, "Truly, Industrial Medicine is religion rediscovered by science, or at least, should be."

When he sees modern science creating far-reaching socio-economic changes which are not always good for the workers, he becomes completely dubious of the success of modern civilisation which he terms as 'machine-civilisation'. But at the same time when he realises Industrial Medicine cannot progress without the help of science, he advocates complete co-operation with all branches of science for the industrial physicians.

Perhaps Dr. Dastur's idea of Industrial Medicine is best expressed in the last article of this book—"From the Diary of Industrial Physician—2", wherein he says, "The human machine has an emotional side besides a physical one. A mechanical approach seldom touches the right cords of the emotional side and may even play on wrong keys". If looked at them from this philosophical angle, all these articles are worth reading several times over. But to a scientist they are not likely to appeal as they are not written with any scientific background. It is true we cannot always agree with him but it is difficult also to disagree with his arguments. At least all of them make us think; and considered from that angle alone the book is an achievement.

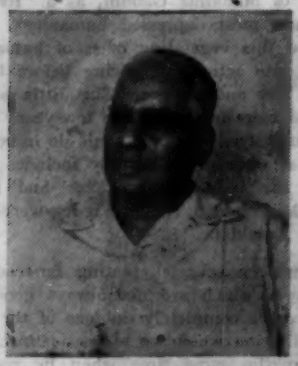
OBITUARIES

Dr. U. B. Narayanrao

Dr. U. B. Narayanrao, ex-Vice-President of the I.M.A. and the Managing Editor of the *Medical Digest*, breathed his last on June 14, 1960, after a short illness.

He was born on November 23, 1895 at Udyavar in South Kanara. His schooling was done in his home village and also in Udipi from where he passed his examinations with credit. At Hyderabad, Sind (now in Pakistan), he studied L.C.P.S. After 4 years' course he obtained his diploma and entered the Bombay Government service. After about 20 months he left government service and set up independent practice in Bombay. But he soon found that Bombay would not be suitable for him and he shifted to Girgaum. Here he very quickly made a position in the medical profession.

The treatment meted out to licentiates in government service and elsewhere were repugnant to him and he started a fight for the betterment of conditions of the licentiates. With this idea in view, in 1933, he participated in the All-India Licentiate's Conference held in Bombay and was elected its general secretary. In 1933 he started a monthly medical journal, the *Medical*



DR. U. B. NARAYANRAO

DR. S. N. SEN

DR. S. S. DUTT

Digest. In 1935 he started another journal, *Indian Journal of Venereal Diseases and Dermatology*.

In 1938 he was elected to the Bombay Medical Council. He held this position till 1955 and was nominated by the Bombay Government for a further period of 5 years till 1960. He fought for democratising the Medical Council for establishment of a uniform standard of medical education in the country and for strict adherence to medical ethics.

In 1945, the Government of India nominated him as a member of the Health Survey and Development Committee, and in the same year he was elected as vice-president of I.M.A. (Central). The following year he became the President of the Bombay Branch, I.M.A. During this period the then British Government offered him the title of Rao Saheb which he declined.

In 1950, the Government of India elected him as a member of the Health Panel of the Planning Commission. The Bombay Government nominated him to the Allocation Committee of the E.S.I.C. in 1954. In 1958, he was nominated to the Indian Medical Council and this nomination was extended for a further period of 5 years. He was elected general secretary of the All-India Association of Dermatologists and Venereologists and became the managing editor of the quarterly publication, *Indian Journal of Dermatology and Venereology*. He was elected as a delegate to the Indian Section of the 10th International Congress of Dermatology held in London in 1957 and was elected secretary of the Indian Section of the Congress. He held, that for post-graduate studies, students should not necessarily go to foreign countries as he was of opinion that there was sufficient first grade medical talents in this country, to impart the necessary training. He wanted that medical men should be sent to villages on attractive remuneration.

Dr. Narayanrao had to his credit two popular publications: (1) Materia Medica of Pharmacentical Combinations and Specialities and (2) Indigenous Medicinal Specialities.

Dr. S. N. Sen

Born at Bhajanghat (Nadia) in 1885, Dr. Sachindra Nath Sen, a member of the Krishnagar branch, I.M.A., breathed his last on May 2, 1960 after a rather short illness.

Dr. Sen passed the M.B. examination of the Calcutta University in 1913 and settled at Krishnagar as a private practitioner. He was conspicuous for his enthusiasm when for the first time in this town a medical association was founded in 1928. It was this organisation which came under the banner of the I.M.A. as a branch, in 1936. Dr. Sen was one of the most active members of the branch and till his death participated in all its functions.

As a medical practitioner Dr. Sen was very popular and earned a respectable position in the town and the neighbouring villages.

Dr. S. S. Dutt

Dr. Sasanka Sekhar Dutt, president of the Madhubani branch, I.M.A., and a leading doctor of North Behar, breathed his last on April 27, 1960 at the age of 70 years. Death was due to peripheral circulatory failure.

Dr. Dutt obtained his M.B. degree from the Calcutta Medical College in 1919 and was appointed in the Behar Medical Service. He was posted at Patna and Darbhanga Hospitals. After sometime he left government service and set up independent practice at Madhubani. In a short time he became very popular. During this period he was also for some years hony. visiting physician of Madhubani jail.

Dr. Dutt always led a pious and honest life. He was widely known for his professional acumen and though a busy practitioner he still found time to devote some hours everyday for the treatment of poor patients free of cost. He was the secretary of the Madhubani Club for 20 years and was intimately connected with many local organisations.

KURAZOL

LIQUID & TABLETS

A LIGHTNING REMEDY

FOR ASTHMA

Available with Leading Chemists all over India

Adiol Compound

FOR VITALITY & VIGOUR

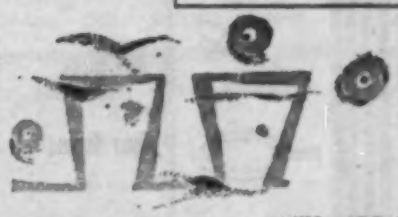
INTERNATIONAL CHEMICAL & BIOLOGICAL INSTITUTE PRIVATE LTD
7, SOUTH END ROAD - BANGALORE 4

Introducing

'Stemetil' PROCHLORPERAZINE

for the management of migraine

'Stemetil' is indicated for the prevention of true migraine and to lessen the frequency or severity of attacks.
'Stemetil' is also indicated in Ménière's syndrome, other labyrinthine disorders and for nausea and vomiting.



Manufactured by
MAY & BAKER LTD

Distributed by MAY & BAKER (INDIA) PRIVATE LTD • BOMBAY • CALCUTTA • GAUHATI • MADRAS • NEW DELHI

the first original tranquillizer

for Emotional Stability

ATARAX

HYDROXYZINE HYDROCHLORIDE

Nervous Insomnia
Nervous Twitches

Available in four forms

TOPPING IN ITS CLASS OF REMEDIES

UNI-U.C.B. (India) Pvt. Ltd.,
22, Bhulabhai Desai Road, BOMBAY 26.

Iodex Relieves Pain

whether it is muscular or rheumatic or associated with bruises, abrasions, strains and sprains. Give 'Iodex' a trial in your next patient suffering from any of these conditions. Prove for yourself that 'Iodex' is the most bland and effective of the iodine ointments: fill in the coupon below and post to Smith Kline & French (India) Ltd., for samples.

SMITH KLINE & FRENCH (INDIA) LIMITED, 141 FORT STREET, BOMBAY 1

Distributed by Pharmed Private Limited – Bombay – Delhi – Calcutta – Madras

To SMITH KLINE & FRENCH (INDIA) LIMITED, 141 FORT STREET, BOMBAY 1

Please send samples of **'Iodex'** *to :*

Name _____

Address _____

X:PAI/90/JIMA _____

'Iodex' is a trade mark

Introducing...

ASMOLYSIN

•

ASMOLYSIN is a combination of Anti-Asthamatic drugs, in *TABLETS FORM.* It is indicated in BRONCHIAL ASTHMA, CARDIAC ASTHMA and in various other conditions associated with BRONCHO SPASM.

•

GLUCONATE LIMITED,

70-A, PRINSEP STREET, CALCUTTA-13.

THE "ANTISEPTIC"

A Monthly Journal of Medicine and Surgery

Founded by the late Dr. U. RAMA RAU in 1904

Consulting Editor: U. KRISHNA RAU, M.B.B.S., M.L.A. Editor: U. VASUDEVA RAU, M.B.B.S.

THE 'ANTISEPTIC' the oldest independent medical monthly has been in continuous & regular publication for over half a century. It is contributed to by hundreds of eminent medical men and women in India and abroad.

THE 'ANTISEPTIC' is every month brimful with original articles, cases and comments, editorials and gleanings etc. Nearly 1000 pages are issued every year, covering almost all branches of medical science, keeping abreast of progress.

THE 'ANTISEPTIC' has achieved international reputation as an up-to-date journal and fearless exponent of the legitimate aims and aspirations of the medical and allied professions. Its tone is bright, fearless and strictly impartial.

THE 'ANTISEPTIC' is therefore being subscribed by nearly 12,000 medical men and women in India, Burma, Ceylon and Pakistan also in Africa, Arabia, China, Malaya, Italy, Tibet, U.S.A., U.S.S.R. Medical Colleges, Medical Associations, Tea Estates etc. are among the subscribers.

VOLUME BEGINS EVERY JANUARY PUBLISHED MONTHLY ON 6TH

Annual Post Paid Subscription, Inland: Rs. 7-50; Foreign – Rs. 10-00;
Single Copy Re. 1-00 Payable in advance.

Editorial & Publishing Office: 323-24, Thambu Chetty St., P.O. Box 166, Madras-1

ZEISS WRITING PROJECTOR "BELSAZAR"

A NEW AID TO THE BUSY INSTRUCTOR

A VISUAL AID FOR EDUCATIONAL INSTITUTIONS

CARL ZEISS JENA

VEB CARL ZEISS JENA

(GERMAN DEMOCRATIC REPUBLIC)

Sole Agents in India:

GORDHANDAS DESAI PRIVATE LIMITED

PHEROZSHAH MEHTA ROAD,
BOMBAY 1.

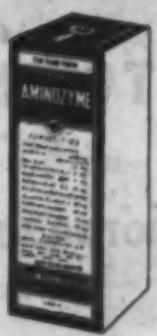
Branches:

22, Linghi Chetty Street, MADRAS 1.

P-7, Mission Row Extension, CALCUTTA 1.

4/2B, "Jwala Mansion" Asaf Ali Road, New Delhi.

Promotes digestion and nutrition



STADMED

Aminozyme

CONTAINS:

Amino acids, B vitamins, vitamin C and enzymes in a non-alcoholic and non-sugar base.

STADMED

Entrozyme

CONTAINS:

Iodochloroxyquinoline, phthalyl-sulphacetamide, sulphaguanidine, B vitamins and diastase.

An efficient remedy for dysenteries and diarrhoea without constipating effect

STADMED PRIVATE LIMITED

House of Aminozyme

CALCUTTA-4

A broad range vaginal antiseptic

TRIKOCID OVULES

Offers prompt control and complete cure of cases of Vaginitis, Pyogenic organisms, trichomonas and thrush.

Each ovule contains:

Sulphanilamide	...	100 mg.
N, N' dehydrozymethyl carbamide	...	10 mg.
Iodochlorhydroxyquinoline	...	100 mg.
Pyridine-mercuric-chloride	...	10 mg.
Urea 10 mg., Alum 10 mg. and Tannic acid 50 mg.		

Broadest spectrum in dysenteries

ENTOZINE
with
Chloroquine

Each Tablet contains:

Iodochloroxyquinoline	...	0.2 gm.
Chloroquine Diphosphate	...	10.0 mg
Sulphadiazine ...	...	0.162 gm
Sulphaquanidine ...	...	0.26 gm.

Mfd. in India by:

HIND CHEMICALS LTD., KANPUR.

Just Out, 1959 : Medical Students and General Practitioners' indispensable Guide.

BED-SIDE MEDICINE

Tenth Edition : thoroughly revised, largely rewritten and amplified. Demy, nearly 1600 pages 612 diagrams and 2 multicoloured plates.

By Professors A. R. Majumdar and S. C. Chatterjee with seven specialist collaborators from the School of Tropical Medicine, Medical College, Calcutta and Nilratan Sarker Medical College, Calcutta.

This combined text-book of Clinical and Systematic Medicine has described comprehensively all aspects of Medicine including Medical Case Examination and the Medical Diseases in their etiology, pathology, clinical course, prognosis, differential diagnosis and treatment. Also Laboratory methods.

Price, Rupees Twentysix only : Postage Extra.

Scientific Publication Concern,
9, WELLINGTON SQUARE, CALCUTTA-13.

TRADE MARK I.T.L.

MYVITEL

A non-alcoholic multivitamin syrup in a flavoured syrup base with extra vitamins added

Manufacturers :

THE MYSORE INDUSTRIAL & TESTING LABORATORY, LIMITED.

MALLESWARAM, BANGALORE-3

℞ **EAR DROPS**

Phenol..... 5 gr
Morphin hydrochloride..... 2 gr
Glycerin..... 1 dr

AT LEAST ONE of every four prescriptions contains glycerin. That's why, in the doctor's work, glycerin must be of the highest quality and purity. PYRAMID GLYCERIN conforms strictly to British Pharmacopoeia specifications. It's made by HINDUSTAN LEVER LIMITED so it sets a standard of reliability and purity.

PYRAMID GLYCERIN

Distributed by Imperial Chemical Industries (India) Private Ltd. Bombay, Calcutta, Delhi, Madras

PYG. 17-33

A PRODUCT OF HINDUSTAN LEVER LTD.

Safe

Potent

Avafortan

ANTISPASMODIC & ANALGESIC

With a powerful anticholinergic and myotropic effect

...having a wide margin of safety and low toxicity.

Indicated in all painful spasms of the alimentary tract, severe migraine, angina pectoris, bronchial asthma and tenesmus— *In Biliary and Urinary Colic—and in Labour pains.*

Avafortan contains a mixture of Iso-amyl ∝ -[N-(β-diethyl-amino-ethyl)]-aminophenyl-acetate-bis-phenyl-pyrazolone-methyl-amino-methane sulphonate (**Avapyrazone**) and Sodium phenyl-dimethyl-pyrazolone-methyl-amino-methane sulphonate.

ASTA

Detailed literature on request.

ASTA-WERKE A-G.,
Brackwede-West Germany

Manufactured in India by: **KHANDELWAL LABORATORIES PVT., LTD.**
BOMBAY-12

In bacillary dysentery and gastro-enteritis

Streptomycin Tablets 'Glaxo'

QUICKEST SAFEST ECONOMICAL

Each tablet contains the equivalent of 200 mg. streptomycin base.
In foil packs of 20.

Comycin Syrup

for infants and children

Comycin Syrup containing equal parts of streptomycin and dihydrostreptomycin is more suitable. It is palatable and readily accepted by the child. Comycin Syrup exerts an entirely local bactericidal action in the gut and can be safely given to the dehydrated child.

Bottles of 60 ml.

GLAXO

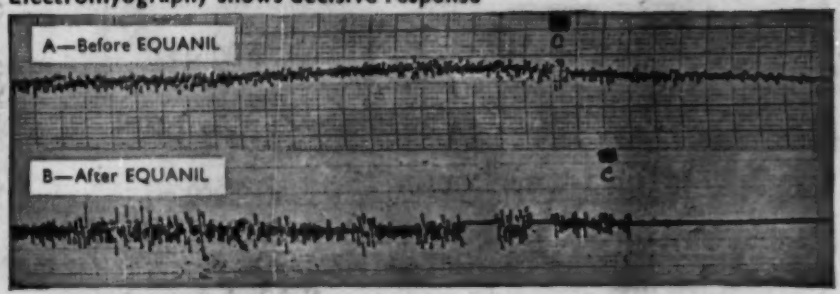
GLAXO LABORATORIES (INDIA) PRIVATE LTD. Bombay • Calcutta • Madras • New Delhi
Depots: Srinagar • Gauhati • Vijayawada

C. 15

Reduces Muscular Tension

Equanil*

Electromyography shows decisive response



Tracing A, made before medication, reveals a marked action potential following the command to relax at point C. Note the difficulty and slowness with which the patient responded.

In tracing B, even though a high action potential appeared at command point C the patient showed a definite and almost immediate ability to respond.[1]

The remarkable effectiveness of EQUANIL may be demonstrated in two ways. One is by its ability to relieve muscle spasm and neuromuscular tension.[1] The second is by its ability to relieve mental tension and anxiety.

1. Dickel, H. A., et al.: West. J. Surg., April, 1956.

Usual Dosage: 1 tablet t.i.d. The dose may be adjusted either up or down, according to the clinical response of the patient.

Supplied: 0.4 Gm. tablets, bottles of 20, 100 and 250.
0.2 Gm. tablets, bottles of 20 and 250.

anti-anxiety factor with muscle-relaxing action
...relieves tension

Wyeth

JOHN WYETH & BROTHER LIMITED, LONDON
(Incorporated in England with Limited Liability)
Indian Branch: Steelcrete House, Dinshaw Wacha Road, Bombay 1.
* Trade Mark

J. 79

ORIGINAL CONTRIBUTION TO THE
CHEMOTHERAPY OF ANKYLOSTOMIASIS
WITH

"ANKLOZID"

OXY-BROMO-NAPHTHOL
TABLETS.

Free from Toxicity

Eradicates the Hook-worms and Ova completely within two days.

Please contact us for samples

PHYTOSYNTH LABORATORIES

P.B. No. 65, COCHIN-2.

HEALTH'S

ZYMOTONE

A Palatable, Nutritive & Digestive Tonic.

Zymotone Provides:

- Digestive enzymes to aid digestion.
- Whole natural B-Complex from liver & Yeast—plus crystalline B. Factors.
- Lipotropic agents in maintaining liver function and to prevent vascular degeneration.
- Amino acids from animal proteins—& valuable nutrients to build up physical & nervous system.
- Vitamin B_{12} & minerals—tissue & blood building factors.

Each 30 ml. contains	
Diastase	500 mg.
Pepsin	125 mg.
Papain	75 mg.
Proteolysed liver	250 mg.
.. Casein	250 mg.
Ext. Yeast	200 mg.
Vit. B_1	3 mg.
Vit. B_2	2 mg.
Vit. B_6	1 mg.
Niacinamide	50 mg.
Panthenol	2 mg.
Vit. B_{12}	4 mcgm.
Inositol	100 mg
Betaine	100 mg.
Cal. Glycerophos	300 mg.
Manganese ..	10 mg.
Alcohol	15% v/v.

INDIAN HEALTH INSTITUTE & LABORATORY LTD.
1, HEALTH INSTITUTE ROAD, CALCUTTA-26

NAVARATNA

SPASMO PERTUSOL

A well balanced combination of proved Indigenous drugs and

NEW SYNTHETIC SPASMOLYTICS.

(Diphenin and Ortho-methoxy-phenoxy-propandiol)

Very palatable and free from untoward reactions.

Not habit forming.

VERY EFFECTIVE IN RELIEVING BRONCHIAL SPASMS, CONTROLS COUGH & COLD SPECIALLY INDICATED IN WHOOPING COUGH AND ALL OTHER AFFECTIONS OF THE UPPER RESPIRATORY TRACT.

NAVARATNA
PHARMACEUTICAL LABORATORIES
P.O. Box No. 13, Cochin-2.

Printed by Sri Tarani Kanta Basu at Sri Gouranga Press Private Ltd., 5, Chintamani Das Lane, Calcutta-9 and published by him on behalf of the Indian Medical Association from 23, Samavaya Mansions, Corporation Place, Calcutta-13.
Editor—Dr. P. K. Guha, M.B., M.R.C.S. (Eng.), D.O.M.S. (Lond.)

Still further improved

with Chlorpheniramine maleate

UNICARBAZAN

Potent antihistaminic,

antiemetic & local anaesthetic too.

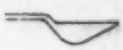
in

Tropical Eosinophilia

Filariasis,

Ascariasis

Each tablet contains :
Diethyl Carbamazine Citrate 50 mg.
Chlorpheniramine maleate 1.25 mg.



Each 5 ml. contain :
Diethyl Carbamazine Citrate 120 mg.
Chlorpheniramine maleate 3 mg.
in syrup base.

COMPOSITION:

Diethyl Carbamazine Citrate	0.4 G.
Chlorpheniramine maleate	10 mg.
Benzyl Alcohol	2%

as preservative in 2 ml.

UNICHEM LABORATORIES BOMBAY 26.

Cover and Advertisement pages printed at the Venus Printing Works 52/7, Bepin Behari Ganguly Street, Calcutta-12.